Examining the influence of the coach athlete relationship on motivation and performance in female rugby players

J. Paige Gregson, BPHED

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Supervisor: Philip Wilson, PhD

Faculty of Applied Health Sciences
Brock University
St.Catharines, Ontario

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Abstract

The purpose of the study was two-fold; first, the association between interpersonal coaching styles and self-determined motivation was examined, followed by the investigation of the motivation-performance relationship. Participants included 221 female Canadian Interuniversity Sport (CIS) rugby players, aged sixteen to thirty-three ($M = 20.1$: $SD = 2.26$), who reported the number of years they played CIS rugby ($M = 2.3$: $SD = 1.37$) and organized rugby ($M = 5.9$: $SD = 2.31$).

Multiple and bivariate regressions were employed with autonomy-support, structure, and involvement accounting for 17%, 41% and 22% of the variance of competence, autonomy and relatedness. The three basic needs accounted for 40% of the variance of motivation, and motivation accounted for 2% of the variance of athletes' perceptions of performance. Findings indicated that autonomy-support emerged as a predictor of all three basic needs, involvement predicted relatedness and competence, autonomy predicted motivation, and motivation predicted athletes' perception of performance.

Table of Contents

List of Abbreviations

BNSSS – Basic Need Satisfaction in Sport Scale

BNT – Basic Needs Theory

BPN – Basic Psychological Needs

BRSQ – Behavioural Regulation in Sport Questionnaire

CAMM – Coach-Athlete Motivation Model

CET – Cognitive Evaluation Theory

CIS – Canadian Interuniversity Sport

COT – Causality Orientation Theory

GCT – Goal Contents Theory

GPAI – Games Performance Assessment Instrument

HMIEM – Hierarchical Model of Intrinsic and Extrinsic Motivation

IBS-S – Interpersonal Behaviour Scale for Sport

NCAA – National Collegiate Athletic Association

OIT – Organismic Integration Theory

SDI – Self-Determined Index

SDT – Self-Determination Theory

Chapter 1 – Introduction

Importance of Sport in Canada

According to the 2004 National Household Survey of Participation in Sport, thirty-one percent (7.7 million) of Canadians sixteen years of age or older participated regularly in one or more sports (Bloom, Grant, & Watt, 2005). However, these participation rates are declining, with sport participation of individuals aged sixteen years and older dropping from forty-five percent in 1992 to thirty-one percent in 2004 (Bloom et al., 2005). In recognition of declining participation rates of sport in Canada, the Canadian Sport Policy was created in 2002, with the intention of combating participation trends (Bloom et al., 2005). The creation of the Canadian Sport Policy was justified based on the contributions to be derived from sport, including personal, cultural and economic reasons (Canadian Heritage, 2008).

Sport, as a form of physical activity, contributes to the overall health and well-being of the participant, leading to a potentially longer, higher quality life (Bloom et al., 2005). Some physical benefits of sport participation include, an increased resistance to heart disease, cancer, diabetes, obesity (Bouchard, Blair, & Haskell, 2007; Gilmour, 2007), and a reduced incidence of various negative health risks, such as osteoporosis and arthritis (Canadian Heritage, 2008). In total, the economic impact of physical inactivity on the health care system in Canada has been estimated at 2.60 percent ($5.3 billion) of total health care cost in 2001 (Katzmarzyk & Janssen, 2004). Along with the physical benefits of sport, participation has also been linked to improved psychological health including reduced depression, stress, anxiety (Aşçi, 2003; Salmon, 2001; Scully, Kremer, Meeade, Graham, & Dudgeon, 1998), and increased self-esteem (Scully et al., 1998).

According to the National Household Survey on Participation in Sport (2004), respondents indicated that sport participation developed personal skills that carry over into the workplace and the community. Sport participants have reported that the personal skills and attitudes that are developed through sport include problem-solving, decision making, honesty, sense of fair play, goal setting and goal commitment, as well as commitment to values (Bloom et al., 2005). Important social skills are also developed through sport participation which often transcend across life domains and become integrated into one's personal and professional lives (Bloom et al., 2005). Social skills that transfer from sport include teamwork, leadership, communications, personal management and administrative skills (Bloom et al., 2005). Sport also contributes to the participant's social development by building the participant's social network through increased contacts, community involvement, and friendships that can last a lifetime (Bloom et al., 2005). Social networks are important as they generate trust and willingness to interact with others outside of sport and generate social cohesion in Canadian society, thereby building social capital (Bloom et al., 2005).

Sport is an integral component of cultural development in Canada with individuals aged sixteen years and older participating in multiple roles within sport, including active participation (31.04%, 7.7 million), volunteering (8.32%, 4.5 million), and attending various sporting events (45.41%, 11.3 million; Bloom et al., 2005). Participants often identify themselves with their sport, which elicits a sense of pride, not only in themselves but as a community as well as a nation (Bloom et al., 2005). The nation-wide benefits of sport participation are also felt by the economic sector of Canada. In 2004, the total household expenditure on sport was estimated at $15.8 billion, or $495

Canadian per person, accounting for 2.18 percent of total household expenditure (Bloom et al., 2005). Sport also positively impacts the Canadian economy by accounting for two percent of the jobs in 1999, including coaches, referees, paid players, sporting goods, clubs, facilities, organizations and government positions (Bloom et al., 2005). In brief, the contributions of sport are multifaceted, ongoing and represent an essential component of Canadian society.

Contributions of Canadian Interuniversity Sport

Participation in the Canadian Interuniversity Sport (CIS) system can provide a number of potential benefits, some of which are specific to the student-athlete experience. First, the teammates a participant acquires provide an immediate social network on campus and alleviate feelings of loneliness and stress that come with dramatic life changes (Mather & Winston, 1998; Paul, Poole, & Jakubowyc, 1998; Smallman, Sowa, & Young, 1991). The second potential benefit addresses the demands of being a student-athlete and suggests that involvement in a varsity team sport can foster enhanced organization and time-management skills during the varsity season (Miller & Kerr, 2002). The third potential benefit of being a student-athlete is the tangible rewards that one might acquire as a result of competing on a university sports team. According to the Association of Universities and Colleges of Canada (2008), in the 2003-04 season, approximately one in four CIS student-athletes received an athletic award (i.e., financial assistance), with the average award total being $1,500. In addition to the tangible rewards, the rare student-athlete who excels in his/her sport may benefit from his/her university experience by continuing on to a professional career in his/her sport. For example, Jean-Philippe Darche who played football and graduated from McGill

University in 1999 was drafted by the National Football League in 2000 and played for the Seattle Seahawks, competing in the 2006 Super Bowl (CIS, 2005). Although the last example noted may only benefit a small portion of CIS athletes, it emphasizes the opportunities that CIS athletics can provide to athletes of the highest caliber and performance level.

Performance in Sport

Although competitive sport is undertaken for numerous reasons, the primary goal of participants and organizations is to be successful and perform at one's optimal potential (Eitzen, 1993). Successful performance in sport is accompanied by money, popularity, bragging rights, and pride (Parish & Williams, 2007). The quality of performance therefore becomes the focal point of the sporting experience as competition level rises, which elicits additional beneficial outcomes (Eitzen, 1993). Because of the overall importance ascribed to performance in competitive sport, this paper will address performance as an outcome of motivation in CIS sport.

University sport represents one of the highest levels of competitive sport in North America. Due to the popularity of the National Collegiate Athletic Association (NCAA), a great deal of research on university sport surrounds the high-quality performance in the United States (Miller & Kerr, 2002). Generalizing the research conducted on the NCAA to the CIS system is problematic because the two systems vary dramatically (Miller & Kerr, 2002). More specifically, unlike NCAA athletes, CIS athletes experience limited television coverage, low attendance levels, less financial support, no athlete specific housing, and no athlete specific services, such as study hall or life skills programming (Miller & Kerr, 2002). Finally, inspection of existing literature indicates a caveat in the

literature, whereby studies measuring performance in the context of CIS sport it limited. Therefore, the inclusion of Canadian student-athlete performance as a construct can contribute to the existing literature by exploring a new demographic, thereby extending external validity.

Overall, performance in the sporting arena is a complex recipe that differs by individual, team and situation. According to Coleman Griffith (1925), the father of sport psychology, an athlete entering a competitive situation is to be considered a mind-body organism as opposed to a mere physiological machine. Empirical evidence supports that measuring psychological factors in addition to physiological indices allows one to more accurately predict performance (Burke & Putai, 1996). Understanding psychological factors in competitive athletes is essential as such factors have the ability to contribute to performance understanding above and beyond the skill and ability of the athlete. This was demonstrated by Marsh and Perry (2005) who found that in a sample of elite National female and male swimmers, self-concept accounted for twelve to thirteen percent of performance above previous personal best times. The potential ability of psychological factors, such as motivation, to influence performance is important as they serve as potential mechanisms through which optimal performance may be enhanced. The existing literature in the area supports the notion that numerous psychological factors and dispositions can either facilitate or hinder performance in sport, including, but not limited to, competitive anxiety (Jones, 1995; Woodman & Hardy, 2001), self-efficacy (Feltz & Lirgg, 2001; Moritz, Feltz, Fahrbach, & Mack, 2000) self-confidence (Feltz, 2007), self-concept (Marsh & Perry, 2005), coping (Hoar, Kowalski, Gaudreau, & Crocker, 2006; Haney & Long, 1995), goal setting (Weinberg, Harmison, Rosenkranz, & Hookom, 2005;

Burton, Naylor, & Holliday, 2001), mental imagery (Hall, Rodgers, & Barr, 1990), team-cohesion (Carron, Colman, Wheeler, & Stevens, 2002; Beal, Cohen, Burke, & McLendon, 2003), perfectionism, and achievement goals (Stoeber, Uphill, & Hotham, 2009).

Motivation has also been reported to play a role in sport performance. Qualitative analyses conducted using a sample of NCAA coaches (Giacobbi, Whitney, Roper, & Butryn, 2002) and male National volleyball athletes (Males, Kerr, Thatcher, & Bellew, 2006) indicated that motivation influences performance. Giacobbi and colleagues (2002) interviewed ten NCAA Division I coaches, from seven different sports, and reported that successful college athletes were highly motivated. In contrast, national male volleyball players that were unsuccessful at a European Spring Cup attributed their poor performance to a lack of motivation of several athletes on their team (Males et al., 2006). Other qualitative research has described elite track and field athletes motives in terms of quality as opposed to quantity, reporting that these athlete possess different kinds of motives, including intrinsic motives (enjoyment), self-determined extrinsic motives (importance of hard work) and nonself-determined extrinsic motives (popularity, recognition, respect; Mallett & Hanrahan, 2002). Furthermore, motives and performance have been assessed quantitatively, reporting that elite female field hockey players scored higher on motives and performance in comparison to a sample of sub-elite players (Elferink-Gemser, Visscher, Lemmink, & Mulder, 2007). Mouratidis, Vansteenkiste, Lens, and Sideridis (2008) also used quantitative analysis and found that amotivation negatively predicted both intra-individual progress ($\beta = -0.28$) and inter-individual performance ($\beta = -0.26$). Similarly, Blanchard, Mask, Vallerand, Sablonniere, and

Provencher (2007) found that contextual and situational motivation had a positive small-moderate relationship with team and individual performance in collegiate basketball players. Finally, two more recent studies have reported that self-determined motivation, represented by an index (one motivation score that integrates different forms of motivation that vary in the degree to which an individuals' motives are internalized) significantly predicted objective performance (Gillet, Berjot, & Gobancé, 2010a; Gillet, Vallerand, Amoura, & Baldes, 2010b). First, Gillet and colleagues (2010b) conducted a study with 101 female and male French judokas and reported that a situational motivational index significantly and positively predicted objective tournament performance ($\beta = 0.22$), measured by tournament rank. Furthermore, Gillet and colleagues (2010a) conducted a three year longitudinal study with tennis players and reported that the contextual motivation index significantly predicted player performance ($\beta = 0.21$) in the following season. In brief, while the current research supports the claim that motivation is linked with performance, the scope of available research conducted quantitatively on this relationship is limited in size and breadth, thereby demonstrating an avenue for further research (Vallerand, 2007). Furthermore, the previous literature suggests that in addition to the quantity, the quality of motivation matters, which also provides an avenue to be explored in the motivation-performance relationship.

The coaching-performance relationship

An athlete's environment is a multidimensional, dynamic component of the athletic experience that is highly influenced by significant individuals in the athletes' life, including parents (Fraser-Thomas & Deakin, 2008; Gagné, Ryan, & Bargmann, 2003), siblings (Fraser-Thomas & Deakin, 2008), teammates (Gregson & Wilson, 2008), peers

(Fraser-Thomas & Deakin, 2008), and coaches (Gagné et al., 2003; Hollembeak & Amorose, 2005; Kipp & Amorose, 2008). Of particular interest in the present study is the influence of the coach, as the coach plays a crucial role in CIS level competition, where the athlete is submerged into a new environment void of many significant others (Miller & Kerr, 2002). The coaches' role entails structuring practice, team and position selections, establishing goals, game tactics and plays, providing feedback, and teaching skills which can be influential in the cognitive, affective, and physical domain of the athlete (Amorose, 2007). Moreover, the coach must determine the competitive level of the league and organize the team's approach accordingly (Lyle, 2002), such that competitive organizations such as CIS sport receive the proper level of coaching. Competitive sport requires performance coaches which are characterized by high levels of commitment, more stable coach-athlete relationships and greater focus on medium to long term planning, monitoring, decision making and management skills to facilitate control of performance (Lyle, 2002). Since performance coaches are often held responsible for competition results (Mallet & Côte, 2006), a clear understanding of the potential paths through which coaches can, or do effect performance, is essential.

Empirical research indicates that coaches have an impact on a variety of factors linked with sport performance (Horn, 2008). The literature on coaching has assessed the link between coaching behaviours and psychological variables, including but not limited to, competitive anxiety (Vealey, Armstrong, Comar, & Greenleaf, 1998), self-confidence (Hays, Maynard, Thomas, & Bawden, 2007; Le Roux, 2007), relatedness (Reinboth, Duda, & Ntoumanis, 2004), competence (Reinboth et al., 2004), autonomy (Reinboth et al., 2004), motivation (Amorose & Anderson-Butcher, 2007; Gillet et al., 2010a), coping

(Lafreniere, Jowett, Vallerand, Donahue, & Lorimer, 2008), goal orientation (Kabush, 2008), team-cohesion (Jowett & Chaundy, 2004), self-efficacy (Bourdley, Kavussanu, & Ring, 2008), fear of failure, and self-talk (Conroy & Coatsworth, 2007). While many of these psychological concepts have been associated with athletic performance, further investigations examining the coach-performance relationship using psychological concepts could yield a greater understanding of this potentially important relationship (Horn, 2008). In order to develop these research interests, a theoretical framework was used in order to provide a framework for predictions and potentially assist in explaining "why" and "how" coaches impact athlete performance (Hill, 2001).

The importance of a theoretical framework

Theory represents an important avenue through which research questions can be addressed scientifically. In order to comprehend the reasoning for choosing a specific theory, it is important to understand what a theory is and why using a theoretical framework is important. Theory refers to "a set of interrelated concepts, definitions, and propositions that presents a systematic view of events or situations by specifying relations among variables in order to explain and predict events or situations" (Glanz, Lewis, & Rimer, 1997, p. 21). Therefore, in accordance with this conceptual definition, a theory serves as a guide for selecting concepts in addition to identifying how to combine concepts and the means through which concepts should be measured (Noar & Zimmerman, 2005). Therefore, the theoretical framework allows the researcher to generate the study in a way that advances cumulative knowledge about a topic because major concepts have already been identified. It also may provide the researcher with confidence in concept selection and measurement methods.

The second important feature of using a theory is that the theory helps to facilitate the generation of hypotheses for research, which in turn develops the knowledge base in a discipline (Hill, 2001). Hypotheses are declarative sentences that make a statement regarding the relationship between two or more variables (Kerlinger, 1979). The main feature of identifying hypotheses is that they allow for the formation of predictions of relationships in research with minimal distortion of the researchers opinions and beliefs (Kerlinger, 1979). By forming theory-based hypotheses, the researcher is able to identify specific relationships that are proposed to "exist" or be important, thereby increasing the likelihood that such relationships are assessed and evaluated with empirical data (Kerlinger, 1979).

The final integral feature of any theory is that it could allow a researcher to form an explanation regarding observed phenomena. According to Forscher (1963), research is similar to constructing an edifice whereby the bricks are facts, the brick-maker is the researcher, the blueprint for placing the bricks is the theory, and the edifice is the explanation of the phenomenon. This analogy infers that a theory is essential in order to ensure that sound, reliable facts are developed into an explanation of a phenomenon. Without a theory to guide us, the facts may be assembled in a faulty manner which will lead to an incomplete explanation due to poor assembly. A theory allows a researcher to identify the facts that need to be gathered in order to form a strong explanation of a behaviour or phenomenon that can withstand the test of time. If the researcher identifies a gap in the literature, or a missing fact to support the explanation, another study could be implemented, based on the theoretical framework, with the intention of filling the void. In brief, theories attempt to identify concepts and relationships with the intent to explain a

phenomenon. Therefore, the importance of theory based research lies in the ability of the theory to identify important concepts, to generate solid hypotheses, and to develop an explanation of the phenomenon. Of particular interest in this study was Self-Determination Theory (SDT; Ryan & Deci, 2002), which outlines important concepts in the attempt to explain human motivation, behaviour and well-being.

Self-Determination Theory: A theoretical overview

Theories abound in every discipline, including sport, as researchers strive to "make sense" of human behaviour (Hill, 2001). SDT has evolved over the past three decades to form a macro level theory that embraces both an organismic and a dialectical framework that studies personality, growth, and development (Ryan & Deci, 2002). The organismic viewpoint assumes that humans are active organisms, that they have an innate tendency towards psychological growth and development, that they seek to engage in challenging experiences and maximize their human potential while achieving a unified sense of self (Ryan & Deci, 2002). The dialectical viewpoint adds that the social environment combines with humans natural tendencies to form an integrative component that can either facilitate or hinder an individual's healthy growth and development (Ryan & Deci, 2002). SDT is comprised of five mini-theories that include Cognitive Evaluation Theory (CET), Organismic Integration Theory (OIT), Causality Orientation Theory (COT), Basic Needs Theory (BNT), and Goal Contents Theory (GCT). Each theory comprising the SDT approach deals with a slightly different aspect of motivation and human development.

CET (Deci, 1975; Deci & Ryan, 1980) was the first mini-theory formulated to describe social contextual effects on an individual's intrinsic motives, through the

mediation of perceived locus of causality (autonomy) and perceived competence. The CET further specifies that social contexts that promote greater fulfillment in locus of causality and competence facilitate intrinsic motives (Ryan & Deci, 2002). In contrast, a social context that triggers an external locus of causality or decreased competence likely undermines intrinsic motivation (Ryan & Deci, 2002). The second mini theory, OIT, assumes that people are naturally prone to integrating their experiences, given they have the necessary tools to do so. Furthermore, Ryan and Deci (2002) posit that the relative internalization of motives exists in the form of a motivational continuum, rather than a dichotomy (e.g., intrinsic vs. extrinsic motivation), whereby motives vary in the degree to which they are self-regulated and emanate from one's self. Amotivation anchors the nonself-determined end of the motivational continuum, followed by extrinsic motives, (e.g., external regulation, introjected regulation, identified regulation, and integrated regulation), and finally, intrinsic regulation anchors the most self-determined end of the continuum (Ryan & Deci, 2002). The third mini-theory, COT (Deci & Ryan, 1985), describes how a person's inner resources combine with prior interactions and social contexts over time to form a person's motivation, behaviour and experiences. This approach was intended to identify personality characteristics that are integral to the regulation of behaviours and experiences, including autonomy-oriented, controlled and impersonal causality orientations (Ryan & Deci, 2002). The fourth mini-theory, BNT, put forth by Deci and Ryan (2000), suggests that basic psychological needs (BPN) exist, with the qualification as a basic need being contingent on a direct influence on well-being. Specifically, Ryan and Deci (2002) argue that authentic fulfillment of autonomy, competence, and relatedness needs have been identified within the BNT, and that they

continue to persist in the SDT literature as the central requirements for optimal self-regulation and adaptive human functioning. Finally, GCT contends that intrinsic and extrinsic goals influence individual's motives and well-being differently, such that intrinsic goals foster more self-determined motives, greater well-being and lower ill-being, while extrinsic motives have the opposite effect.

SDT is one of many theories used in describing the etiology of behavioural change; however, there are two unique features that make it suitable for use in sport. The first unique feature of SDT is the concept of a continuum of motivation, which identifies that it is the quality, as opposed to merely the quantity, of motivation that is important (Ryan & Deci, 2002). The continuum is anchored by amotivation and intrinsic motivation, with different forms of extrinsic motivation existing in the middle. To begin, amotivation represents the lack of intention to act, and therefore is either not acted on at all or carried out passively, with no intention to actually act in that manner (Ryan & Deci, 2002). Extrinsic motivation is next along the continuum, with external regulation being the least self-determined form, as it refers to motivation to obtain external rewards or to avoid punishment (Ryan & Deci, 2002). A slightly more internalized extrinsic motivation is introjected regulation, which represents a motive performed to avoid guilt and shame or to receive praise or feelings of self-worth (Ryan & Deci, 2002). Identified regulation, is the next form of extrinsic motivation along the continuum, whereby an individual carries out the behaviour because they values the benefits derived from the behaviour; however, the value of the action is not yet fully internalized (Ryan & Deci, 2002). Integrated regulation is the most autonomous form of extrinsic motivation, whereby the value of the behaviour is recognized and endorsed and completely integrated into one's

sense of self, such that the behaviour is line with other components of the self (Ryan & Deci, 2002). Finally, intrinsic motivation, the most self-determined form of motivation refers to doing an activity for enjoyment or the inherent satisfaction derived from participation in the behaviour itself (Ryan & Deci, 2002).

Research has been conducted to support the plausibility of the motivational continuum in the context of sport, physical education and exercise. Chatzisarantis, Hagger, Biddle, Smith, and Wang (2002) performed a meta-analysis of research from 1974-2002 and confirmed that the continuum proposed in accordance with SDT was plausible given the data collected. Furthermore, Chatzisarantis and colleagues (2002) identified that the pattern of correlations between external, introjected, identified and intrinsic regulation conform to a simplex-ordered structure whereby adjacent points along SDT's continuum of motivation were more positively correlated in comparison to more distal points (Chatzisarantis et al., 2002). In addition, research conducted specifically in the sport domain supported the continuum, with stronger correlations being reported between more proximal forms of motivation (Cresswell & Eklund, 2005; Hodge, Allen, & Smellie, 2008; McDonough & Crocker, 2007). Furthermore, self-determined forms of motivation (intrinsic motivation, and identified regulation) reported positive associations with each other and negative associations with non self-determined motives (introjected regulation, external regulation, and amotivation), while non self-determined motives were positively associated with each other (Cresswell & Eklund, 2005; Hodge et al., 2008; McDonough & Crocker, 2008).

The second unique feature of SDT is the notion of basic psychological needs (BPN) or 'nutriments' that are essential and universal across all subgroups (e.g., age,

ethnicity, and gender) and includes autonomy, competence, and relatedness (Ryan & Deci, 2002). Autonomy refers to perceiving that an individual is the origin of his/her behaviours, and that each individual has a choice while in control of his/her own actions (Ryan & Deci, 2002). Competence represents feeling effective in one`s interactions within social contexts and experiencing opportunities to practice and display ones capabilities (Ryan & Deci, 2002). Finally, relatedness refers to feeling a sense of connection and belongingness to others in the contextual environment, while being cared for, and reciprocating the care to others (Ryan & Deci, 2002). According to the SDT, social contextual factors, such as the coach-athlete relationship, can facilitate or thwart the fulfillment of BPN.

Studies have been conducted that examine various coaching behaviours/styles and all three psychological needs postulated by Ryan and Deci (2002). These studies have found that perceptions of coaching behaviours/styles are associated with greater need satisfaction, including autonomy-support (Adie, Duda, & Ntoumanis, 2008; Amorose & Anderson-Butcher, 2007), training and instruction, democratic behaviour, autocratic behaviour, social support and positive feedback (Hollembeak & Amorose, 2005). Furthermore, studies have explored autonomy-support, improvement, and social support provided by the coach, and have found moderate to strong relationships with autonomy, competence and relatedness accordingly (Reinboth, Duda, & Ntoumanis, 2004). Specifically, perceptions of autonomy-support has been strongly related to autonomy, moderately related to relatedness, and reported a weak-moderate relationship with competence (Amorose & Anderson-Butcher, 2007). In brief, study results indicate that

various coaching behaviours and styles have been associated with the fulfillment of BPN which warrants future investigation.

Finally, Deci and Ryan (2002) advocate that greater fulfillment of BPN facilitates greater endorsement of more self-determined motives. Study findings have indicated that autonomy is a significant weak (Gillet, Berjot, & Gobancé, 2010; Kipp & Amorose, 2008; McDonough & Crocker, 2007), moderate (Adie et al., 2008; Amorose & Anderson-Butcher, 2007; Hollembeak & Amorose, 2005), to strong predictor (Blanchard, Amiot, Perreault, Vallerand, & Provencher, 2009) of motivation, competence is a weak (Amorose & Anderson-Butcher, 2007; Blanchard et al., 2009; Gillet et al., 2010; Hollembeak & Amorose, 2005; Kipp & Amorose, 2008; Mouratidis et al., 2008) to moderate predictor of motivation (Adie et al., 2008; McDonough & Crocker, 2007), and relatedness is a weak (Adie et al., 2008; Amorose & Anderson-Butcher, 2007; Blanchard et al., 2009; Gillet et al., 2010a; Hollembeak & Amorose, 2005) to moderate predictor of motivation (McDonough & Crocker, 2007). Taken further, researchers have grouped BPN into one index and found that BPN significantly predicted self-determined motivation at a weak-moderate (Álvarez, Balaguer, Castillo, & Duda, 2009) to moderate level (Blanchard, Mask, Vallerand, Sablonniere, & Provencher, 2007). Furthermore, summation of the previous literature findings indicate that autonomy is the strongest predictor of motivation, followed by competence and relatedness (Amorose & Anderson-Butcher, 2007; Blanchard et al., 2009; Gillet et al., 2010a; Hollembeak & Amorose, 2005; Kipp & Amorose, 2008; Sarrazin et al., 2002)

Two contextual models that extend on Deci and Ryan's proposes series of relationships between contextual factors, BPN and motivation, include Vallerand's

(1997) Hierarchical Model of Intrinsic and Extrinsic Motivation (HMIEM), and Mageau and Vallerand's (2003) Coach-Athlete Motivation Model (CAMM). Both models were integrated into the current study, such that some concepts overlapped in both models, other concepts more closely represented one model, and some concepts were unique to only one of the models.

Coach-Athlete Motivational Model

Mageau and Vallerand (2003) have proposed a motivational model (see Figure 1.1) that extends previous work with the primary intention of developing a more representative model of the coach-athlete relationship. This motivational model presents a four stage sequence whereby the coach's personal orientation, the context within which the coach is coaching, and the coach's perceptions of the athletes' behaviour and motivation influence the autonomy-support provided by the coach (Mageau & Vallerand, 2003). Autonomy-support refers to an individual in an authoritative position that considers other's perspectives, acknowledges their feelings, and provides them with pertinent information and opportunities for choice while minimizing the use of pressures and demands (Mageau & Vallerand, 2003). An autonomy-supportive coach is thought to provide an ample amount of support within specific limits and rules, provide a rational for tasks, acknowledge and address the feelings of others, provide an opportunity for independent innovative work, provide non-controlling feedback, avoid overt control, controlling statements, tangible rewards or guilt-induced criticisms, and prevent ego-involving acts (Mageau & Vallerand, 2003). In turn, the athletes' perceptions of the coach's autonomy-support influence the fulfillment of the athletes' perceptions of BPN of competence, autonomy and relatedness. In addition to autonomy-supportive

behaviours, Mageau and Vallerand (2003) posit that the structure instilled by the coach and the involvement that the coach has with the athletes are also important interpersonal coaching components that influence the fulfillment of an athletes' perceived competence and relatedness respectively. Coaches who provide structure offer detailed instructions and provide their athletes with the necessary information and experience to be successful, while involved coaches provide athletes with support and feelings of connectedness (Mageau & Vallerand, 2003). Specifically, Mageau and Vallerand (2003) advocate that structure only influences competence, while involvement influences relatedness, and autonomy-support is linked to all three BPN. The final stage of the CAMM indicates that BPN are related to an athletes' perception of their intrinsic motivation and self determined motives (e.g., integrated regulation and identified regulation), whereby greater fulfillment of fundamental needs facilitates these self-determined motives.

Examination of literature that studied the role of interpersonal coaching styles indicated that relatively little is known about the role played by the perceptions of the coach's structure and involvement with respect to the coach, despite the vast amount of literature that has measured autonomy-support in the sport context (Horn, 2008). A systematic review examining autonomy-support, structure and involvement in reference to the coach in sport psychology identified seventeen studies, with the majority of the studies (10; 58.82%) examining autonomy-support, and only four (23.52%) studies examining all three coaching variables (Wilson, Mack, & Gregson, 2009). The existing literature indicates that autonomy-support is positively related to competence, autonomy and relatedness (Amorose & Anderson-Butcher, 2007; Conroy & Coatsworth, 2007; Adie et al., 2008; Amorose, Smith, & Anderson-Butcher, 2005). Adie et al. (2008) reported

that autonomy-support was the weakest correlate of competence ($r = 0.17$), followed by autonomy ($r = 0.26$), and then relatedness ($r = 0.40$). Similarly, Amorose and Anderson-Butcher (2007) found that autonomy-support was also the weakest correlate of competence ($r = 0.21$); however, autonomy-support appeared to be the strongest correlate of autonomy ($r = 0.85$), with relatedness falling in the middle ($r = 0.51$). Álvarez and colleagues (2009) found that autonomy-support moderately predicted BPN (grouped into one index), with the BPN index significantly mediating the relationship between autonomy-support and self-determined motivation (as an index). In addition, Amorose and Anderson-Butcher (2007) reported that BPN served as a mediator between autonomy-support and an athletes' motivation orientation, and furthermore that autonomy-supportive coaching behaviours should be directly linked to intrinsic motivation in order to further improve the model. Gregson and Wilson (2008) studied all three coaching behaviours and found that autonomy-support, structure and involvement had weak to moderate correlations with competence and autonomy, and an extremely strong correlation with relatedness to their head coach. Potential reasoning for the extremely strong relationship was that the instructions for the coach's interpersonal style and the relatedness instrument were both in reference to the head coach, which could inadvertently result in a strong correlation (Gregson & Wilson, 2008).

To summarize, the coaching literature drawn from Mageau and Vallerand's (2003) motivational model is quite limited to date, and for the most part has focused primarily on autonomy-support (Wilson et al., 2009). Therefore, further exploration of the three interpersonal coaching styles could provide us with useful information regarding the relationship between the coach's style and the athlete's performance. In

order to examine the motivation-performance relationship, the HMIEM (1997) was also integrated into the current study, as it extends on the CAMM (2003) by examining motivational consequences such as sport performance.

The Hierarchical Model of Intrinsic and Extrinsic Motivation

The HMIEM (Vallerand, 1997) indicates that motivation is best explained through a four stage sequence of relationships which occur at three levels of generality. Vallerand purports that environmental factors facilitate or impede the fulfillment of BPN, which in turn influence motivation, and result in cognitive, behavioural and affective outcomes as depicted in Figure 1.2.

Vallerand (1997) outlines five postulates that explain the central tenets of the HMIEM. The first postulate extends from the CAMM and indicates that a complete representation of motivation must consider the constructs of intrinsic motivation, extrinsic motivation and amotivation (Vallerand, 1997). Vallerand's (1997) second postulate implies that a hierarchy of motivation exists whereby intrinsic motivation, extrinsic motivation and amotivation exist at three levels of generality, varying from global, to contextual, to situational. The third postulate of Vallerand's (1997) model posits that there are two main determinants of motivation at any given level of generality. The first set of determinants represents social factors, including human (e.g., instructions from a coach, and encouragement from a parent) and non-human (e.g., weather, and field conditions) factors that are influential through the mediation of BPN. The second determinant is called the top-down effect, which describes how global motivation can influence contextual motivation, or how contextual motivation can influence situational motivation (Vallerand, 1997). Similarly, the fourth postulate suggests that motivation has

a recursive effect, whereby motivation from a lower level of generality can affect motivation higher up in the hierarchy, which explains the bidirectional relationship between adjacent levels of motivation (Vallerand, 1997). Finally, the fifth postulate of the HMIEM suggests that motivation results in consequences or outcomes that can be identified as behavioural, cognitive or affective outcomes at the same level of generality (Vallerand, 1997).

Research Questions

Two overall research questions have driven the formation of this study. First, how does a coach influence an athlete's motives in competitive rugby? This research question was broken down into two distinct research objectives. The first objective was to examine the influence of an athlete's perception of the autonomy-support, structure and involvement provided by the coach, in relation to fulfillment of the BPN of autonomy, competence and relatedness. The second objective was to assess the relationship between BPN and athletes' perceptions of their own motivation.

The second major research question was, how does an athlete's motives relate to their performance? This question was again broken down into two research objectives. The first research objective was to identify the strength and direction of the relationship between each form of motivation along the SDT continuum. The second research objective was to examine the influence of self-determined motivation, as represented by an index, on an athlete's performance.

Hypotheses

The research questions were explored using five distinct hypotheses.

H_1: Perceptions of a coach's autonomy-support would be positively related to perceived competence, autonomy and relatedness. According to Mageau and Vallerand's (2003) Coach-Athlete Motivation Model, autonomy-supportive coaches would positively influence the fulfillment of an athlete's perceived BPN. More specifically, it was anticipated that autonomy-support would most strongly predict autonomy, followed by relatedness, and lastly competence (Adie et al., 2008; Amorose & Anderson-butcher, 2007).

H_2: Perception of the coach's structure and involvement would be positively related to fulfillment of autonomy, competence and relatedness. Furthermore, Mageau and Vallerand (2003) advocated that structure would only predict competence, and involvement would only predict relatedness. Thus, it was hypothesized that structure would most strongly predict competence of the three basic psychological needs, and involvement would most strongly predict relatedness of all basic psychological needs.

H_3: The BPN of competence, autonomy and relatedness were hypothesized to positively correlate with self-determined motivation. In particular, autonomy was hypothesized to be the strongest predictor of self-determined motives, followed by competence, and relatedness (McDonough & Crocker, 2007; Adie et al., 2008).

H_4: Forms of motives that were more proximal along the continuum would be more strongly associated with one another. Furthermore, self-determined motives would be positively associated with other self-determined forms and negatively associated with non self-determined forms, while non self-determined forms would be positively

associated with each other. According to Deci and Ryan (2002), a simplex ordered structure exists such that correlations between adjacent motive forms are higher in the positive direction than correlations between more distal dimensions. Several studies have assessed the existence of a continuum of motivation, and their findings support the notion of stronger relationships in closer proximity (Hodge et al., 2008; McDonough & Crocker, 2007; Cresswell & Eklund, 2005).

H_5: Self-determined motivation, as represented by a self-determined index, would positively predict performance in rugby, from the perspective of the coach as well as the perspective of the athlete. Vallerand (1997), advocates that motivation influences multiple outcomes, such as performance. Research indicates that situational (Gillet et al., 2010a) and contextual (Gillet et al., 2010b) motivation significantly predicts subsequent performance.

Chapter 2 - Methods

Participants

Participants included 221 CIS female rugby players from thirteen universities across Canada. Participants ranged in age from 16 to 33 years of age ($M = 20.1$; $SD = 2.26$), and reported playing organized rugby between one and fifteen years ($M = 5.9$; $SD = 2.31$). Participants also indicated that they were currently in their first to fifth CIS rugby season ($M = 2.3$; $SD = 1.37$). The highest level of rugby that participants had played outside of CIS rugby ranged from high school to national level, with club rugby representing the most frequently reported level ($n = 82$). Participants varied significantly on the amount of hours a week they spent training for rugby in pre-season ($M = 9.4$; $SD = 5.37$; *Range* = 0-26), in-season ($M = 12.3$; $SD = 4.54$; *Range* = 1-30), and post-season ($M = 7.6$; $SD = 4.09$; *Range* = 0-20). Every playing position in rugby was reported by at least one participant, with wing being reported most frequently ($n = 37$). Finally, participants identified themselves as being a starter ($n = 112$) more frequently than a non-starter, or sometimes started/sometimes did not start.

Instruments

Demographics. The first section of the questionnaire package was used to collect general information, including age, position, number of years playing competitive rugby, number of years competing for their current CIS team, highest level competed, number of training hours pre-season, in-season and post-season.

Interpersonal Coaching Styles. The Interpersonal Behaviour Scale for Sport (IBS-S), developed by Pelletier, Beaudry, Sharp, and Otis (2008), was used to assess the coaches' interpersonal style. The IBS-S consisted of twelve items, four items for each of

the three subscales of support for autonomy (sample item: "My coach provides me with lots of opportunities to make personal decision in what I do."), care and relatedness (sample item: "I feel that my coach sincerely cares about me."), and support for incompetence (sample item: "The feedback I get from my coach takes the form of useless criticism"). For the purposes of this study, in order to be consistent with Mageau and Vallerand's (2003) coach-athlete motivation model, support for autonomy was referred to as autonomy-support, care and relatedness as involvement, and support for incompetence as structure for the remainder of this paper. The four items specific to structure were reverse coded to have a positive connotation and display the direction of relationships purported by Mageau and Vallerand (2003). Participants were provided with a seven point Likert scale ranging from 1 "never" to 7 "always". The internal consistency reliability estimates for the scale have not been published and remain unknown. The only known study to date that has used the IBS-S reported moderate correlations between all three interpersonal coaching styles and an athlete's motivation, represented as a self-determined index, indicating some support for the criterion validity of this instrument (Kabush, 2007).

Basic Psychological Needs. BPN were measured using twenty items from the Basic Needs Satisfaction Scale in Sport (BNSSS; Lonsdale, Hodge, & Ng, 2010). Participants were asked to report their feelings and experiences when participating in rugby in all three subscales, using five items for competence (sample item: "I am skilled at rugby"), ten items for autonomy (sample item: "I participate in rugby willingly"), and five items for relatedness (sample item: "I have close relationships with people in rugby"). Items were measured on a seven point Likert scale ranging from 1 "not at all

true" to 7 "very true". Initial validation of the instrument was not available due to the fact that the manuscript was under review. However, a portion of the development of the BNSSS was presented at the Association of Applied Sport Psychology conference in Salt Lake City (Hodge, Lonsdale, & Ng, 2009). The results of two studies were presented, and the second study indicated the presence of a four factor model, including IPLOC/Volition ($\alpha = 0.78$), choice ($\alpha = 0.82$), relatedness ($\alpha = 0.77$), and competence ($\alpha = 0.80$; Hodge, et al., 2009).

Self-Determined Motivation. Motivation was measured using 24 items, from the Behavioural Regulation in Sport Questionnaire (BRSQ; Lonsdale, Hodge, & Rose, 2008) designed specifically for competitive sport participants. Participants were asked to complete the statement "I participate in rugby...", in all six subscales, including general intrinsic motivation (sample item: "because I enjoy it"), integrated regulation (sample item: "because it's part of who I am"), identified regulation (sample item: "because the benefits of rugby are important to me"), introjected regulation (sample item: "because I would feel guilty if I quit"), external regulation (sample item: "because I feel pressured from other people to play"), and amotivation (sample item: "but I question why I continue"). These six subscales were measured using four items each, on a 7 point Likert scale anchored by 1 ("not at all true") to 7 ("very true"). In addition, a single motivation index, called the self-determination index was calculated, whereby a higher score indicated a more self determined motivation profile. The scoring procedure, advocated by Vallerand (1997) assigned intrinsic motivation, integrated regulation and identified regulation with item weights of +3, +2, +1, respectively, as they represented self-determined forms of motivation, while amotivation, extrinsic and introjected regulation

were assigned weights of -3, -2, and -1, because they were nonself-determined forms of motivation.

Instrument development and initial validation findings support the use of the BRSQ (Lonsdale et al., 2008) in competitive sport at both the elite, as well as lower levels of competitive sport. The initial study evaluated the BRSQ (Lonsdale et al., 2008) with participants that were both female (n = 173), and male (n = 141), who competed in thirty-eight different sports, and were not elite nor recreation level participants. Cronbach alpha values were reported for amotivation ($\alpha = 0.91$), external regulation ($\alpha = 0.91$), introjected regulation ($\alpha = 0.91$), identified regulation ($\alpha = 0.77$), integrated regulation ($\alpha = 0.76$), and intrinsic motivation ($\alpha = 0.85$; Lonsdale et al., 2008). Follow up studies were conducted with a sample of thirty-four male rugby players, competing in amateur club rugby (Lonsdale et al., 2008). The goal of the final study was to evaluate the test-retest reliability via interclass coefficient across a one week time period for amotivation ($r = 0.87$), external regulation ($r = 0.79$), introjected regulation ($r = 0.87$), identified regulation ($r = 0.88$), integrated regulation ($r = 0.90$), and intrinsic motivation ($r = 0.73$).

Performance. Performance was measured using a rugby specific modified version of the Game Performance Assessment Instrument (GPAI) created by Oslin, Mitchell and Griffith, (1998), which was initially designed to measure performance in invasive games. The GPAI assessed seven components including decision making, skill execution, adjust, cover, support, guard/mark, and base. Participants were asked to respond to one item from each category, including decision making (sample item: "I make appropriate decision about what to do with the ball during the game"), skill execution (sample item: "I efficiently execute rugby skills in a game"), adjust (sample item: "I move appropriately

offensively, and defensively, as necessitated by the flow of the game"), cover, (sample item: "I provide appropriate defensive cover, help, backup for a player making a challenge for a ball"), support (sample item: "I provide appropriate support for a teammate with the ball by being in a position to receive a pass"), mark (sample item: "I appropriately mark the opponent who may or may not have the ball"), and base (sample item: "I return to my appropriate position between skill attempts"). Items were assessed on a five point Likert scale that was anchored by 1 ("very weak performance") and 5 ("very effective performance"). While internal consistency reliability estimates were not reported, stability-reliability correlation coefficients were reported for decisions made (0.85- 0.90), skill execution (0.84 - 0.97), support (0.87 - 0.99), and adjust (0.97), because these were the only measures assessed by the physical education teacher. Initial assessments were made on sixth grade students in physical education classes in multiple sports, including soccer, basketball and volleyball. Item-content relevance and representation, as well as structural components of the rugby specific version of the GPAI were assessed in a secondary study. The findings provide adequate support for the use of this instrument in CIS female rugby (see Appendix B for more detail).

Procedure

A detailed diagram identifying the flow of participants, sample sizes at each stage of the recruitment process, and reasons for failure to participate are outlined in Figure 2.1. The recruitment process began with an internet search identifying the head coaches of all CIS female rugby teams. Thereafter, CIS coaches were contacted via e-mail asking them for their consent to approach the athletes on their corresponding team. For those universities of the consenting coaches located in Ontario, a time was arranged that was

best suited for the coaches, potential participants, and the data collector. The actual data collection process began with a brief presentation of the purpose of the study, an outline of the expectations of the participants, and reassurance that data would remain confidential and that they could withdraw at any point in the study. Participants were then handed a questionnaire package, which contained a letter of information, consent form, questionnaire, and a coded envelope. Upon completion, participants placed the completed consent form and questionnaire in the coded envelope provided in the package, which was necessary in order to connect the player's data to the coaches' data.

The second method of data collection was designed for players who could not meet with the principle student investigator, including players that attended universities outside Ontario, and participants from Ontario universities that were unable to attend the arranged meeting set by the coaches and researcher. The second method followed the same first two steps as method one; however in the initial contact e-mail with the head coach, coaches' were asked if they were willing to forward a letter of invitation to their athletes. The letter of invitation was the exact same letter provided to athletes' contacted in-person, with the exception of one component, which was a hyperlink to the online version of the survey. Upon clicking the link to the online survey, participants first viewed the informed consent letter, which afforded participants the opportunity to consent, taking them directly to the survey, or to not consent, which would take them to a page thanking them for their consideration. The only variation that existed between the online survey and the paper version of the survey was a question in the online survey that required participants to enter their corresponding unique code which was provided for them in the email forwarded from their coach.

In addition to providing consent to approach the athletes, coaches were asked to participate in the study as well; each coach was asked to assess the performance of every athlete on their team. If the coach agreed to assess the athlete's performance, they were provided with the opportunity to complete the assessments via an online survey or a paper version which was sent to them with pre-paid postage with a letter of informed consent.

Study Design

The design of the study was a cross-sectional, non-experimental design, specifically using survey instruments. Data were collected from participant teams during their regular season ($t = 1$), during their play-off season ($t = 2$), after their season was complete ($t = 8$) or a combination of during play-off season and after play-offs were completed ($t = 2$).

Data Analysis Procedures

Data analysis was a multi-stage procedure, consisting of six steps that were employed in the order identified. Data analysis began by assessing the data to identify any missing data using Missing Values Analysis (MVA). Second, internal consistency reliability scores (Cronbach's coefficient, α; Cronbach, 1951) were assessed for all perceptions of coaches interpersonal style, perception of basic psychological needs, motives and performance from the perspective of the athlete and the coach. Third, descriptive statistics were computed for all variables in order to provide values that allow for comparison to existing literature. Fourth, correlations (Pearson r) were calculated to identify the strength and direction of each proposed relationship in the hybrid model. More specifically, bivariate correlations were computed between perceptions of coaching

variables and basic psychological need variables, basic psychological need variables and the SDI, and the SDI and performance. Fifth, multiple linear regression analysis was employed to test the series of relationships in this study, including four multiple regression models. In the first three multiple regression models, structure, autonomy-support and involvement served as predictor variables and the basic needs of competence, autonomy, and relatedness each served as the criterion variable. The fourth regression assessed basic psychological needs as predictor variables and motivation (SDI) as the criterion variable. Finally, two bivariate regressions were employed, such that motivation, represented as a self-determined index served as the predictor variable, and the athletes' perception of performance as well as the coaches' and the athlete's perception of performance each served as the criterion variable.

Chapter 3: Results

Missing Values Analysis

The initial data set contained 353 cases of CIS female rugby players. Data screening began with 12 cases being deleted due to failure to provide any data or consent. Of those 12 cases deleted, only 1 case chose not to provide consent, the remaining 11 provided consent, but did not continue the survey. Thereafter, 117 cases were deleted because no response was provided by the athletes, although athletes' assessment data was provided by the coach. Finally, 3 more cases were deleted because they only provided responses to the demographics portion of the survey. The final data set that was used for the remainder of the analysis contained data for 221 female CIS rugby players.

MVA was employed with the athletes' responses to all coaching, BPN, motivation, and performance variables. The demographics portion of the data was not included in this analysis as it was not pertinent to the research questions. The MVA reported that there were no variables with 5 percent or more missing values. Little's Missing Completely at Random (MCAR) test reported no significant patterns, χ^2 (3194) = 3301.83, $p = 0.09$. Analysis of the univariate statistics revealed that the total cases missing per variable ranged from 1 (0.45%) case to 7 (3.17%) cases. Expectation Maximization (EM) was computed for all coaching, BPN, motivation, and performance variables, and all missing values for the corresponding variables were replaced using the transformation process in SPSS.

A second MVA was conducted for coaches' responses of the performance variables for all athletes. MVA reported that 13 (5.88%) to 14 (6.33%) of cases were missing for all variables. Little's MCAR test reported no significant patterns, χ^2 (18) =

18.26, $p = 0.44$. EM was computed for all performance variables and all missing values for the corresponding variables were replaced using the transformation process in SPSS.

Estimates of Reliability

Estimates of reliability were computed for all coaching, BPN, motivation and performance variables. Cronbach (α) coefficients (Cronbach, 1951; see Table 1) ranged from a low of 0.76 for identified regulation (BRSQ) to a high of 0.95 for coach's perception of performance (GPAI-C). Cronbach alpha coefficients were on average 0.85 ($SD = 0.05$).

Descriptive Statistics

Descriptive statistics were computed for all coaching, BPN, motivation, and performance variables within the study to examine response patterns within the sample data (see Table 2). Findings indicated that CIS female rugby players reported perceptions of structure ($M = 5.84$; $SD = 1.22$) to be the most strongly endorsed of the interpersonal coaching styles. Examination of the responses to the BNSSS (Hodge et al., 2010) indicated that athlete participants perceived to have relatively high levels of all three basic psychological needs. Interpretation of the BRSQ (Lonsdale et al., 2008) descriptive scores indicated that players reported greater levels of self-determined motives ($M = 5.47$ - 6.37; $SD = 0.84 – 1.11$), while nonself-determined motives were not as well endorsed ($M = 2.16$ - 2.89; $SD = 1.22$ - 1.64). Finally, CIS female rugby players reported similar perceptions of their own performance ($M = 3.68$; $SD = 0.50$) compared to that of the coaches ($M = 3.64$; $SD = 0.79$).

Bivariate Correlations

Bivariate correlation (Pearson *r*) scores between interpersonal coaching styles, basic psychological needs, SDI, and performance subscales are presented in Table 3, and the bivariate correlations scores between the six different forms of motivation are presented in Table 4. Several patterns emerged from the analysis. First, inspection of the IBS-S inter-scale relationships revealed significant positive moderate to strong relationships between the three interpersonal coaching styles. Second, the patterns of inter-scale relationships between the BNSSS subscale scores were significant positive moderate to strong relationships. Third, the subscale scores from the BRSQ reported several patterns of relationships – the relationships between the self-determined motive subscales (intrinsic motivation, integrated regulation and indentified regulation) were all significant positive moderate to strong relationships. Similarly, the relationships between nonself-determined motive subscales (introjected regulation, external regulation, and amotivation), were all significant positive moderate to strong relationships. However, the relationships between the self-determined and nonself-determined motives were all significantly negative, and increased in strength as the forms of motivation became further from each other along the continuum, with the intrinsic motivation-amotivation relationship reporting the strongest relationship. Finally, the athletes and coaches perceptions of performance using the GPAI instrument reported a small to moderate positive relationship.

Taken further, the interclass correlations (Pearson *r*) scores were examined between instruments. The patterns of the relationships that emerged between the IBS-S and BNSSS were all significantly positive, ranging from weak to strong relationships.

Considering all three interpersonal coaching styles, structure emerged as having the weakest relationships with all three needs, while autonomy-support had the strongest. Furthermore, competence was reported to have the weakest relationships with all interpersonal coaching styles, and autonomy reported having the strongest relationships. BPN were also correlated with motivation (SDI), where autonomy was found to be strongly correlated to SDI, and competence and relatedness were moderately correlated to SDI. Finally, patterns of relationships were examined between motivation (SDI) and GPAI-coaches perceptions as well as GPAI- players' perceptions. The findings indicated that SDI was not significantly related to the coaches' perception of performance, but was weakly related to the athletes' perception of performance ($p \leq 0.05$).

Multiple Regression

Multiple regression was employed four times; the first three were used to assess how the three basic psychological needs of competence, autonomy, and relatedness regressed on the three interpersonal coaching styles. Next, motivation, represented as a Self-Determined Index (SDI), was regressed on the three basic psychological needs.

The first regression was employed to test the influence of structure, autonomy-support, and involvement as predictor variables on perceived competence in CIS female rugby players. The results demonstrated that the three interpersonal coaching styles significantly accounted for seventeen percent of the variance of competence ($R^2_{adj} = 0.17$, $F(3, 217) = 16.33$, $p = .000$). An examination of the standardized beta coefficients indicated that autonomy-support ($\beta = 0.28$) and involvement ($\beta = 0.22$) were significant predictors (see Figure 3.1). Next, structure, autonomy-support, and involvement served as predictor variables for autonomy. The findings indicated that the three interpersonal

coaching styles significantly accounted for forty-one percent of the variance of autonomy ($R^2_{adj} = 0.41, F(3, 217) = 51.51, p = .000$). Inspection of the standardized beta coefficients indicated that autonomy-support was the only significant predictor ($\beta = 0.50$; see Figure 3.2). Finally, interpersonal coaching styles were regressed on relatedness. The findings identified that structure, autonomy-support, and involvement significantly predicted relatedness ($R^2_{adj} = 0.22, F(3, 217) = 21.31, p = .000$). Further exploration of the standardized beta coefficients suggested that autonomy-support was the strongest significant predictor ($\beta = 0.31$), followed by involvement ($\beta = 0.28$), and that structure was not a significant predictor (see Figure 3.3).

Next, competence, autonomy and relatedness served as predictor variables for the self-determined index of motivation. Results revealed that the three basic psychological needs significantly accounted for forty percent of the variance of SDI ($R^2_{adj} = 0.40, F(3, 217) = 49.81, p \leq 0.05$). More specifically, the standardized beta coefficients were examined and only autonomy emerged as a significant predictor ($\beta = 0.61$) of SDI (see Figure 3.4).

Bivariate Regression

Two bivariate simple linear regressions were employed, such that SDI served as the predictor variable in both regressions, and the dependent variable was either the athletes' perception of performance, or the coaches' perception of performance. The findings indicated that motivation (SDI) did not significantly predict performance from the coaches' perspective ($R^2_{adj} = 0.00, F(1, 219) = 0.18, p > 0.05$), but motivation (SDI) did predict CIS female rugby performance from the athletes perspective ($R^2_{adj} = 0.02, F(1, 219) = 5.59, p \leq 0.05$).

Chapter 4 - Discussion

The coach has been identified as an important influential agent in the life of an athlete, one who has the opportunity and ability to exert influence on the athletic experience and in doing so, can have an impact on the athlete's behavioural, cognitive and affective responses (Amorose, 2007). Among the factors that have been studied that are influenced by the coach-athlete relationship, motivation has emerged as an essential concept that has been linked to multiple outcomes including, but not limited to burnout (Cresswell & Eklund, 2005; Lonsdale et al., 2010), drop-out (Pelletier et al., 2001;), intention to drop-out (Sarrazin et al., 2002), flow (Kowal & Fortier, 1999), well-being (Gagné et al., 2003; Blanchard et al., 2009), persistence (Pelletier et al., 2001) enjoyment and boredom (Álvarez et al., 2010), and performance (Mouratidis et al., 2008; Gillet et al., 2010a). Of particular interest in the present study is the relationship between motivation and performance, as performance is an essential consideration in the sporting context (Treasure, Lemure, Kuczka, & Standage, 2007).

One theory that emphasizes motivation as a central component is Self-Determination Theory (Deci & Ryan, 2002), which served as the driving theory for the present study. SDT purports that motivation is best represented as a continuum, whereby six different forms of motivation exist, with each form differing in the degree to which they are the self-determined and internalized. Deci and Ryan (2002) advocate that fulfillment of the BPN of competence, autonomy, and relatedness can either facilitate or undermine self-determined motives experienced by the individual. Two frameworks that are based on the central tenets of Self-Determination Theory, titled the "Coach Athlete Motivation Model" (Mageau & Vallerand, 2003) and the "Hierarchical Model of Intrinsic

and Extrinsic Motivation" (Vallerand, 1999), were used in combination as a guiding framework through which the present study was explored. The last three stages of Mageau and Vallerand's (2003) CAMM model were used in the study to assess the influence of interpersonal coaching styles on basic psychological needs, which have in turn been shown to influence self-determined motivation. The HMIEM (Vallerand, 1999) also proposes that basic psychological needs facilitate or thwart motivation; however, the contribution of the HMIEM (Vallerand; 1997) to the current study was to evaluate the relationship between motivation and consequences, such as performance.

The overall purpose of the present study was two-fold. First, the researcher was interested in exploring the influence of interpersonal coaching styles on motivation in the sport of rugby. Second, this study was designed to assess the influence of motivation on performance from the perspective of the athletes themselves, as well as from the coaches' perspective. The first purpose was further broken down into two objectives. The first objective examined the predictive ability of perceptions of the three interpersonal coaching styles of structure, autonomy-support, and involvement on perceptions of the three basic psychological needs of the athletes. In the second objective, the strength of the prediction of the basic psychological needs of competence, autonomy, and relatedness was evaluated in terms of its influence on self-determined motivation. Finally, the second over-arching purpose also generated two research objectives. In the first, the strength and direction of the relationships between the different forms of motivation along the continuum were examined. In the second objective, the predictive ability of motivation on subjective performance was investigated from the perspective of the athlete as well as from the coaches' perspective.

To begin discussing the findings of the study in relation to the existing literature, the first objective of examining the influence of interpersonal coaching styles on BPN was explored. CIS female rugby players reported that of the three BPN, all three interpersonal coaching styles were most strongly correlated to autonomy, followed by relatedness, and lastly competence. In addition, of the three interpersonal coaching styles, autonomy-support was the strongest correlate of all three basic psychological needs, followed by involvement, then structure. Furthermore, the three interpersonal coaching styles served as predictor variables for the first three multiple regression models with competence, autonomy, and relatedness as the dependent variables. The findings indicated that all three interpersonal coaching styles significantly accounted for between seventeen (competence) to forty-one (autonomy) percent of the variance of each BPN. Taken further, of the three interpersonal coaching styles, autonomy-support emerged as the most significantly predictor of each of the basic psychological needs, reporting standardized beta coefficient scores of 0.28 for competence to 0.50 for autonomy. Involvement also emerged as a significant predictor of competence ($\beta = 0.12$) and relatedness ($\beta = 0.28$), whereas structure was not a significant predictor of any BPN. Therefore, in summary, autonomy-support emerged as the strongest significant predictor of all three BPN, involvement significantly predicted competence and relatedness, and structure did not significantly predict BPN.

The existing literature examining the relationship between autonomy-support and BPN has exhibited mixed findings. Of the five studies that measured autonomy-support and BPN, two reported strongest correlations with autonomy (Amorose & Anderson-Butcher, 2007; Gagne et al., 2003), two with relatedness (Gregson & Wilson, 2008; Adie

et al., 2008) and one with competence (Reinboth et al., 2004), whereas one study represented BPN as an index and reported autonomy-support to be a significant, positive predictor ($\beta = 0.47$; Alvarez et al., 2010). In addition, Almagro, Sáenz-Lopez, and Moreno (2010) broke autonomy-support into two components, correlated them with autonomy only, and found significant positive relationships for both "interest in athletes input" ($r = 0.47$) and "praise for autonomous behaviour" ($r = 0.35$). In contrast, one study measured coaches controlling styles, as an opposition to autonomy-support and found that autonomy was the strongest negative correlate ($r = -0.14$; Blanchard et al., 2009). Of the four studies that did not identify competence as the strongest correlate of BPN with autonomy-support, competence was identified as the weakest correlate for all four studies (Adie et al., 2008; Amorose & Anderson-Butcher, 2007; Gagné et al., 2003; Gregson & Wilson, 2008). Standardized beta coefficients were reported in three of the studies with autonomy-support significantly predicting autonomy ($\beta = 0.33 - 0.81$), competence ($\beta = 0.22 - 0.33$), and relatedness ($\beta = 0.19 - 0.47$; Adie et al., 2008; Amorose & Anderson-Butcher, 2007, Reinboth et al., 2004). Furthermore, Blanchard and colleagues (2009) reported controlling styles to predict autonomy ($\beta = -0.22$), but not competence or relatedness.

The results of the current study provided strong support for the first hypothesis, which predicted that autonomy-support would be positively correlated to all of the basic needs, and most strongly predict autonomy, followed by relatedness, then competence. Therefore, the current study findings extended the existing literature by provided further support for the relationship trends between autonomy-support and basic psychological needs. Thus, as advocated by Mageau and Vallerand (2003), coaches who were perceived

to provide athletes with more choice, opportunities to make decisions, while acknowledging athletes' perspectives and feelings, positively influenced the athletes' perceptions of their autonomy, capabilities, and connectedness in the sport of rugby.

The second formulated hypothesis proposed that structure and involvement would both predict basic psychological needs, with structure being the strongest correlate of competence and involvement most strongly relating to relatedness of the three BPN. The hypothesized strength of these relationships were formulated from the theoretical model put forth by Mageau and Vallerand (2003), whereby structure was identified to only predict competence and involvement was denoted to only predict relatedness. The existing literature examining the proposed sets of relationships is limited; however, both studies that have assessed involvement and/or structure have provided contradictory findings to the relationships that were proposed by Mageau and Vallerand (2003). Gregson and Wilson (2008) reported that both structure and involvement were most strongly correlated with relatedness ($r = 0.71$ - 0.73), followed by autonomy ($r = 0.35 – 0.37$), then competence ($r = 0.11 – 0.25$). In addition, Gagne and colleagues (2003) assessed the correlation between involvement and the three BPN and found autonomy to be the strongest correlate ($r = 0.60$), followed by relatedness ($r = 0.50$), then competence ($r = 0.37$). Therefore, no real trend has emerged, with the exception that competence again appeared to be the weakest correlate to both structure and involvement. Therefore the limited existing literature has yielded mixed findings and has not supported the second hypothesis which was based on Mageau and Vallerand's (2003) CAMM.

The findings of the present study provide partial support for the second hypothesis, that structure would most strongly predict competence, and involvement

would most strongly predict relatedness of the three basic needs. Only partial support was provided, as structure failed to significantly predict any of the BPN, and of the three BPN, structure was most strongly correlated with autonomy, not competence, as anticipated by the second hypothesis. The previous literature examining this relationship is mixed, with one study reporting that structure was significantly correlated to and significantly predicted competence, while the other reported a non-significant correlation score between structure and competence.

Potential explanations of the present study findings that structure failed to significantly predict any of the basic needs was largely attributed to the instrumentation used. The first potential issue concerns Mageau and Vallerand's (2003) conceptual definition of structure, as it was quite vague, therefore instrument developers may be forced to derive their own assumptions, thereby causing potential discrepancies between the conceptual and operational definition. More specifically, the IBS-S contained four negatively worded items that concerned perceptions of the feedback provided by the coach, and failed to include items pertaining to the instruction provided by the coach. Furthermore, as indicated, the items were reverse coded in order to represent structure positively, which although is a common practice, may be problematic. Weems and Onwuegbuzie (2001) have indicated that reverse coding negatively worded items may not induce an identical response if the same item had been positively worded. Therefore interpretations derived from the current study, must first consider issues pertaining to the structure subscale of the IBS-S before they exclude perceptions of structure as an important interpersonal coaching style.

In contrast, the current study found similar results to previous literature and propositions put forth by Mageau and Vallerand's (2003) CAMM, in that involvement was significantly associated with and most strongly predicted relatedness of the three basic needs, providing support for half of the second hypothesis. Therefore, interpretation of current study and previous study findings indicates that coaches who spend time with their athletes while showing interest, and genuine care and concern will positively influence the athletes perception of feeling secure and connected to others in the context of sport.

The third hypotheses predicted that the BPN of competence, autonomy, and relatedness, would all be related to, and positively predict self-determined motivation (SDI), with autonomy emerging as the most significant predictor. The inspection of the bivariate correlation scores indicated that BPN reported moderate to strong relationships with self-determined motivation, and autonomy emerged as the strongest correlate. Furthermore, self-determined motivation was regressed on competence, autonomy, and relatedness, accounting for forty percent of the variance of self-determined motivation, with autonomy emerging as the only significant predictor.

The inspection of the existing literature identified autonomy as the strongest correlate of motivation, followed by relatedness, then competence (Amorose & Anderson-Butcher; 2007; Blanchard et al., 2009; Hollembeak & Amorose, 2005; Kipp & Amorose, 2008; Sarrazin et al., 2002). McDonough and Crocker (2008) as well as Gillet and colleagues (2010b) found relatedness to be the strongest correlate, while Lonsdale and colleagues (2009) indicated competence as the strongest correlate of self-determined motivation. Of these studies, three indicated that the culmination of the BPN accounted

for thirty-three to sixty percent of the athletes self-determined index (Blanchard et al., 2009; McDonough & Crocker, 2008) and twenty-two percept of intrinsic motivation (Hollembeak & Amorose, 2005). Taken further, seven studies reported the standardized beta coefficients, with four of them reporting autonomy to be the strongest predictor, with competence and relatedness following as significant predictors (Amorose & Anderson-Butcher, 2007; Blanchard et al., 2009; Hollembeak & Amorose, 2005; Sarrazin et al., 2002). One study also reported autonomy as the strongest predictor, followed by competence as a significant predictor, but relatedness was excluded as a significant predictor (Kipp & Amorose, 2008). Therefore, in summary, examination of the trend in the previous literature indicates that autonomy was the strongest, and competence the weakest correlate and predictor of self-determined motivation.

The primary similarity that emerged from the results of the present study and the existing research was the dominance of autonomy as a significant predictor of self-determined motivation. In contrast to the current literature, relatedness and competence did not significantly predict self-determined motivation. Therefore, the current study findings provided only partial support for the hypothesis that all three BPN would predict motivation, with autonomy serving as the strongest predictor, considering that only autonomy emerged as a significant predictor of motivation in the current study. Therefore, interpretation of the present study findings, in combination with the existing trend, indicates that greater fulfillment of basic psychological needs facilitate a more self-determined motivation profile. Specifically, athletes' who feel that they are provided with choice and opportunities to originate their actions and behaviours may foster a more

autonomous motivational profile, such that motives are more internalized and self-determined.

Considering the vast amount of literature that indicates that competence and relatedness significantly predicts motivation, it seems questionable that the current study findings did not mimic this trend. However, considering the data analysis technique used (multiple regression), in combination with the moderate to strong Pearson correlation coefficients between BPN, a potential explanation lies in the mathematics. As indicated, autonomy was strongly correlated with both competence and relatedness, and strongly predicted motivation ($\beta = 0.61$). Therefore, the predictive ability of competence and relatedness to motivation may have been lost in the multiple regression methods when controlling for other basic needs, specifically autonomy (Allison, 1999).

Furthermore, the compression of self-determined index may have influenced the present study findings. Vallerand, Pelletier, and Koestner (2008), reported that several methods have been used to weight the subscales of motivation with the present study weighting method reflecting the theoretical propositions put forth by SDT. However, Vallerand and colleagues (2008) have suggested that this method of weighting subscales may not account for the contextual factors or activity in determining which activity is optimal. In addition, by combining the six motive forms, the present study limits potentially important information regarding relationships between basic needs and each motive forms, which is a unique feature of SDT.

As indicated previously, there are many variations in the way in which self-determined motivation is measured based on the inclusion of the forms of motivation along the continuum. The current study used the BRSQ-6 (Lonsdale et al., 2008) in order

to examine the six subscales - intrinsic motivation, integrated regulation, identified regulation, introjected regulation, external regulation and amotivation. The findings indicated that self-determined motives were positively associated with each other, and that stronger associations were reported between more proximal forms of motivation. Similarly, non self-determined forms of motivation were positively associated with each other, and stronger correlations were reported amongst more proximal forms. In contrast, self-determined motives were negatively associated with non self-determined motives, with the strength of the relationships increasing in strength as motive forms became more distal along the continuum. However, it must be noted that identified and integrated regulation reported similar relationships with other forms of motivation, as each form reported slightly stronger associations in approximately one-half of the relationships. A similar trend occurred with introjected and external regulation. These findings mimic the initial development and validation studies reported by Lonsdale and colleagues (2008), whereby integrated and identified regulation, as well as introjected and external regulation, indicated similar correlates with all forms of motivation along the continuum. Other existing literature examining the relationships among motive forms have generally provided support for the simplex ordered structure; however, these studies have used the Sport Motivation Scale, which did not include integrated regulation (Cresswell & Eklund, 2005; Hodge et al., 2005; McDonough & Crocker, 2008). The current study findings, in addition to previous studies using the BRSQ (Lonsdale et al., 2008; Lonsdale et al., 2009), bring to attention a threat to discriminate validity, as not all findings support a six level simplex ordered structure, but rather a four level structure. Therefore, the findings of the present study provide support for the fourth hypothesis that motives that were more

proximal along the continuum, were more strongly associated with each other. In addition, the current study findings indicated that self-determined motives were positively associated with one another, and negatively associated with nonself-determined motives, while nonself-determined motives were positively related with each other as predicted by the fourth hypothesis.

The final hypothesis that was examined concerned the relationships between the self-determined motivation (SDI) with performance in rugby from both the coaches' and the athletes' perspective. The results indicated that motivation, as represented by a SDI, significantly predicted only the athletes' perception of performance, accounting for two percent of the variance.

The existing literature investigating the relationship between motivation and performance is limited, and is somewhat challenging to summarize due to the variety of methods used to assess both concepts. Qualitative data has been used to support the notion that the amount of motivation that athletes possess is associated with the quality of their performance; thus, successful athletes are considered highly motivated (Giacobbi et al., 2002), and unsuccessful athletes are said to lack motivation (Males et al., 2006). More recent studies that more closely resemble the current study, have measured motivation quantitatively in relation to the athlete's perception of inter-individual performance and intra-individual progress (Mouratidis et al., 2008), and objective performance (Gillet et al., 2010; Gillet et al., 2010). Previous findings indicate that situational motivation positively predicted objective performance (Gillet et al., 2010a), and contextual motivation positively predicted objective performance (Gillet et al., 2010b). The current study findings, as well previous study reports, provide general support for Vallerand's

HMIEM in that motivation positively predicts desired behavioural outcomes, such as performance in the sport context. Therefore, the findings of the current study provide partial support for the proposed hypothesis that SDI significantly predicted the athletes' perception of performance, yet failed to predict the coaches' perception of performance.

A plausible explanation for the low predictive ability of motivation on sport performance in the current study is the instrumentation used to measure motivation and performance, which differed from previous literature (Gillet et al., 2010a; Gillet et al., 2010b). Representing motivate as an index may have limited important findings that may have emerged from the current study, if motivation had of been measured as the different motivation forms instead. In addition, it must be noted that the GPAI was a subjective measure of performance, whereby the pilot study indicated that 1 item reported poor item content-relevance, and that some participants indicated that some items should be added in order in better represent the concept of performance in the sport of rugby. Therefore, the weak predictive score may have been attributed to the GPAI which may have failed to adequately tap the concept of sport performance. Furthermore, taking into consideration the weak Pearson correlation score between the coaches' and athletes' perception of performance, the construct validity of the GPAI is questionable (Cronbach &Meehl, 1955) as only minor differences existed between the instruments.

Practical Implications

The practical implications derived from the culmination of the current study findings and previous literature is directed at sport coaches, as well as significant others within the sporting context. The existing literature, in conjunction with the present study, indicates that the satisfaction of the basic psychological needs of competence, autonomy,

and relatedness is associated with the motivation experienced by the athlete (Amorose & Anderson-Butcher, 2007; Gagné et al., 2003; Gregson & Wilson, 2008). Furthermore, athletes that feel more capable and effective, connected to others in the sporting environment, while feeling like they have opportunities to make decisions and choices are more likely to internalize their motives, such that they become more self-determined. These findings are important, because more self-determined motives have been considered to be optimal, as they have been found to predict desired sport consequences, including sport persistence, intentions, flow state, vitality, and well-being (Blanchard et al., 2009; Kowal & Fortier, 1999; McDonough & Crocker, 2007; Pelletier et al., 2001; Sarrazin et al., 2002). In addition, the current study, as well as previous literature has found that self-determined motives positively predict perceptions of sport performance to a small degree (Gillet et al., 2010a; Gillet et al., 2010b). Therefore understanding factors that may influence the basic psychological needs presents an avenue through which self-determined motivation may be enhanced.

The current study findings provide additional support for previous research which has indicated that autonomy-support is one coaching style that can play a role and potentially enhance athletes' perception of autonomy, competence, and relatedness (Adie et al., 2008; Amorose & Anderson-Butcher, 2007; Gagné et al., 2003; Gregson & Wilson, 2008; Sarrazin et al., 2002). Therefore, coaches are encouraged to welcome and acknowledge any input of the athletes when designing practices, game plays or player selections (Vallerand, 2007). Additionally, it is recommended that coaches allow athletes to take part in the decision making process, such as designing drills or choosing the

fitness component for a training session (Vallerand, 2007). In doing so, athletes will be more likely to in turn perceive that their basic needs are more satisfied.

Furthermore, the current study investigated the interpersonal coaching styles more comprehensively then most studies, including measures which examined the structure and feedback provided by the coach and the involvement and interest the coach had with the athletes. The current study findings extended upon previous studies by further emphasizing the importance of the coach displaying interest and becoming involved with the athletes. More specifically coaches are encouraged to provide athletes with an interactive environment, which fosters socializing, caring, trust, and respect, while involving important others, including parents and teammates (Vallerand, 2007). By carrying out the suggested coaching styles, athletes are more likely to perceive that their basic needs are more fulfilled, which in turn is more likely to result in self-determined motives, and have positive outcomes.

Limitations

As with any study, the current study has a number of limitations that must be recognized, specifically, aspects of the study design and the recruitment process, as well as the instruments used in the study. First, the study was cross-sectional in nature; therefore, inferences indicating causality are inappropriate (Amorose & Anderson-Butcher, 2007). Furthermore, the results of the current study are limited by the scope of the investigation, as the sample included approximately one third of the population of CIS female rugby players. Therefore, the present study findings may be limited in generalizability to samples in other contexts, including sport, gender, and competitive level (Gagné et al., 2003; Kowal & Fortier, 1999). As such, transferring these findings across settings must be done with caution (Kowal & Fortier, 1999). In addition, since the

questionnaires were self-reported, the participants may have been "biased" in that they completed the survey in a way in which they hoped to be viewed more favorably (Trochim, 2006).

The second major limitation in the study was the recruitment procedure employed, whereby the researcher contacted the head coaches via e-mail addresses provided on public interfaces. Thereafter, they were asked to provide permission to approach the athletes either electronically or through a meeting arranged by the head coach and the researcher. Two primary problems may have resulted from this procedure. First, despite assurance in the letter of informed consent and letter of information that data would remain confidential and that participation was completely voluntary, the athletes that were approached may have felt coerced into participating in the study, and may have answered the questions to be more favorable to their coach in fear that the coach would become aware of their responses. Participants were made aware in the informed consent that coaches would not have access to the data; however, this may still have influenced athletes' responses, possibly inflating the item scores corresponding to the interpersonal coaching styles. Second, since coaches were the first contact person in the recruitment process, coaches may have felt that the findings of the research might negatively influence their coaching position, due to the questions concerning their coaching styles, despite assurance of confidentiality in the informed consent. Therefore, coaches may have chosen not to respond or not to allow their athletes to participate in the study, which would have limited the sample.

The final major limitation in this study concerns the instrumentation, as all instruments were either new, had been used previously but in a different context, or

lacked the supporting development and validity through peer reviewed publications. The first instrument used in the study was the IBS-S, which measured the autonomy-support, structure, and involvement provided by the coach. Since the last two concepts of structure and involvement were relatively new in the context of sport, instrument development was limited, which may have rendered poor content validity. Furthermore, inspection of the items, as well as the construct definitions provided by Mageau and Vallerand's CAMM (2003), indicates an under-representation of autonomy-support (Messick, 1995). Mageau and Vallerand (2003) identify seven key behaviours that together represent autonomy-supportive interpersonal styles; however, only four items were used to measure autonomy-support. Therefore, some of the key components that Mageau and Vallerand (2003) identified in the definition of autonomy-support were not included in the items. It must also be noted, that the IBS-S identified structure as support for incompetence, whereby all items were negatively versed; although reverse coding does alter the intended direction of relationships, the data cannot be considered the same as positively worded items, and the reverse coding of items may reduce the validity and reliability of the construct (Pilotte & Gable, 1990). Furthermore, the development or validation of the IBS-S has not yet been published, which would aid in understanding the formation of the items.

The second instrument used in the current study was the BNSSS (Lonsdale et al., in review) which was the first instrument designed to measure autonomy, competence, and relatedness in the context of sport. Since the instrument was still undergoing review for publication at the time the present study began, knowledge regarding the instrument development and validation was limited to the findings described in the instrument

section. The major concern with this instrument was that while it was intended to measure three concepts, factor analysis reported by Hodge and colleagues (2009) broke autonomy into two components – choice and IPLOC/volition, yielding in fact, four distinct concepts. The inconsistencies between previous research findings and theory, surrounding the number of factors of BPN presents potential violation of the content validity of the BNSSS (Cronbach & Meehl, 1955).

The final instrument that presented concerns for the researcher was the GPAI which was developed for physical education teachers to assess their students in games. A content validity study (see Appendix B) was conducted for this instrument, which indicated that two of the items were considered unclear, and that three items were considered multi-barreled by several judges. Furthermore, the researcher identified that the instrument may be strengthened by providing a reference point for the stem (example: please rank your performance in comparison to the top CIS female rugby players). Such an addition would provide more clarity, as some respondents may have compared their performance to their own optimal performance, while others may have compared themselves to the average CIS female rugby player.

Future Directions

Future direction recommendations for the current study fall into four primary categories, including suggestions pertaining to research design, participants, instrumentation, and theoretical considerations. To begin, future studies should employ a longitudinal study examining the sequence of relationships explored in the current study, which would provide researchers with further insight into the manner in which coaching styles, needs, motives, and performance are altered across the season. Such a study may

provide additional knowledge into the optimal coaching style(s) that facilitate psychological needs, self-determined motives, and improved performance across a rugby season. Furthermore, the number of days that data are collected may significantly influence outcomes. Therefore, it would be interesting to conduct several studies that assessed the sequence of relationships across a typical week, or across an entire season.

Future studies may also benefit from assessing the proposed set of relationships within other populations, including different gender, sports, age, and competitive levels. In doing so, researchers will be able to have a more comprehensive understanding of the means through which interpersonal coaching styles influence basic needs, which facilitate self-determined motives, which in turn influences performance. Moreover, inclusion of different populations may allow researchers to formulate more generalizable predictions in the context of sport, thereby contributing to the external validity of the instruments.

A comprehensive investigation of the construct validity and implementation of necessary modifications to the IBS-S and GPAI may provide researchers with improved instruments to assess interpersonal coaching styles and performance in the sport of rugby. More specifically, it is recommended that the IBS-S undergo a series of studies, the first of which would be to modify and add items, in order to more accurately represent the seven components that Mageau and Vallerand (2003) deem essential in representing autonomy-support. In addition, structure items should be modified to provide positively versed items, as well as adding items that represent the instruction provided to athletes, rather than strictly concentrating on the negative feedback. Thereafter, a study should be conducted that assesses the content validity of the instrument, including item-content relevance, and representation in addition to structural issues. If any modifications are

suggested, another study should be conducted that includes those modifications, and again assesses the content validity of the instrument. Similarly, the modifications recommended by expert judges in the content validity study for the GPAI should be implemented into the GPAI, and then the content validity of the instrument should be again evaluated (after each set of modifications). Thereafter, the criterion validity, in addition to the reliability of the test scores of the instruments, can/should be assessed as the constructs are correlated and regressed upon other constructs deemed important to theory.

The final set of recommendations concern theoretical development of both Vallerand's (1997) HMIEM, and Mageau and Vallerand's (2003) CAMM. Future studies should aim to examine the contextual level in its entirety, including all stages, and both the cognitive and affective outcomes. The findings from such a study would contribute to the existing literature by providing a more comprehensive knowledge base concerning the role of motivation in the context of the sport of rugby. Taken further, a future recommendation may contribute to existing literature by examining the influence of cognitive and affective outcomes on the behavioural outcomes. Such a study would be a natural transition as many studies have indicated that cognitive and affective outcomes of motivation have been linked to performance.

Finally, in the attempt to further explore Mageau and Vallerand's (2003) CAMM, future studies that examine the proposed four stage sequence may provide important information, specifically concerning the first stage of the model. The existing research investigating the first stage of the CAMM is limited. Therefore further studies that examine the influence of the coaches' personal orientation, the context within with the

coach is coaching, and the coaches' perception of the athletes motivation and behaviour on the autonomy-support provided by the coach may serve as an avenue for further consideration. Furthermore, a study that investigates the entire four stage sequence of the CAMM has yet to be conducted, which would contribute to existing literature by indicating potential mechanisms through which the coach may influence an athlete's self-determined motivation (Horn, 2008).

Conclusion

The findings of the present study contributed to furthering our understanding of the associations between interpersonal coaching styles, need satisfaction and motivation, as well as motivation and performance in the sport of rugby. CIS female rugby players reported that coaches who provide opportunities for choice and to be involved in the decision-making process, while acknowledging the athletes' perspectives and feelings, positively influences the athletes' need to feel competent, autonomous, and related in the sporting context. In addition, CIS coaches who care for, and are interested and involved with, their athletes positively influence their need for competence and relatedness. Furthermore, of the three basic needs, autonomy was reported as the most significant issue in predicting need for CIS female rugby players' motivational profile. Finally, motivation positively influences an athletes' performance, from the perception of the athlete.

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Table 1

Estimates of Reliability for Coaching, Psychological and Performance Variables

Subscale	α	Inter-item Range	Item *M* Range	Item *SD* Range
Involvement	.82	0.33-0.73	5.18-5.91	1.28-1.52
Autonomy-Support	.80	0.46-0.60	4.77-5.21	1.36-1.56
Structure	.85	0.53-0.64	5.31-6.20	1.29-1.67
Relatedness	.85	0.37-0.75	5.97-6.35	0.93-1.17
Competence	.84	0.33-0.83	5.40-6.08	0.89-1.33
Autonomy	.87	0.40-0.71	4.47-6.55	0.79-1.50
Intrinsic Motivation	.92	0.66-0.84	6.13-6.50	0.89-1.01
Integrated Regulation	.84	0.45-0.72	5.40-5.87	1.27-1.38
Identified Regulation	.76	0.37-0.70	5.20-6.11	1.09-1.39
Introjected Regulation	.88	0.59-0.80	2.49-3.26	1.70-2.04
External Regulation	.89	0.61-0.73	2.07-2.39	1.49-1.66
Amotivation	.88	0.55-0.77	1.98-2.61	1.34-1.48
GPAI-P	.81	0.23-0.52	3.47-3.93	0.64-0.78
GPAI-C	.95	0.65-0.78	3.43-3.77	0.83-0.98

Note: GPAI-P = Games Performance Assessment Instrument-Players perceptions; GPAI-C = Games Performance Assessment Instrument-Coaches perceptions.

Table 2

Descriptive Statistics for Coaching, Psychological, and Performance Variables

Subscale	*M*	*SD*	Skewness	Kurtosis
Involvement	5.50	1.14	-0.90	0.38
Autonomy-Support	4.94	1.16	-0.56	0.10
Structure	5.84	1.22	-1.38	1.47
Relatedness	6.07	0.88	-1.16	1.36
Competence	5.67	0.82	-0.36	-0.29
Autonomy	5.72	0.82	-0.78	0.34
Intrinsic Motivation	6.37	0.84	-1.70	3.00
Integrated Regulation	5.47	1.11	-0.85	0.99
Identified Regulation	5.74	.97	-1.03	1.93
Introjected Regulation	2.98	2.68	0.59	-0.61
External Regulation	2.23	1.37	1.30	1.13
Amotivation	2.16	1.22	1.49	2.30
SDI	87.85	41.68	-1.39	2.31
GPAI-P	3.68	0.50	-0.16	0.30
GPAI-C	3.64	0.79	-0.64	0.65

Note: SDI = Self-determined Index; GPAI-P = Games Performance Assessment Instrument-Players perceptions; GPAI-C = Games Performance Assessment Instrument-Coaches perceptions.

Table 3

Bivariate Correlation Scores for Relationships between Coaching, Basic Needs and Performance Variables

Subscale	1	2	3	4	5	6	7	8	9
1. Involvement	-								
2. Aut-Support	*.71***	-							
3. Structure	*.64***	*.55***	-						
4. Relatedness	*.43***	*.44***	*.24***	-					
5. Competence	*.38***	*.41***	*.24***	*.51***	-				
7. Autonomy	*.53***	*.63***	*.43***	*.63***	*.63***	-			
8. SDI	*.43***	*.46***	*.46***	*.42***	*.42***	*.64***	-		
9. GPAI-P	*.13**	*.24***	*.10*	*.32***	*.56***	*.40***	*.16**	-	
10. GPAI-C	*.21***	*.24***	*.18***	*.22***	*.31***	*.29***	*.03*	*.27***	

Note: Aut-Support = Autonomy Support; SDI = Self-Determined Index; GPAI-P = Games Performance Assessment Instrument-Players perceptions; GPAI-C = Games Performance Assessment Instrument-Coaches perceptions.
*$p \leq 0.05$; ** $p \leq 0.01$.

Table 4

Bivariate Correlation Scores for Relationships Between Motivation Forms

Subscale	1	2	3	4	5	6
1. Intrinsic Motivation	-					
2. Integrated Regulation	*.53***	-				
3. Identified Regulation	*.55***	*.67***	-			
4. Introjected Regulation	*-.48***	*-.21 ***	*-.22***	-		
5. External Regulation	*-.53***	*-.24***	*-.23***	*.70***	-	
6. Amotivation	*-.67***	*-.30***	*-.35***	*.58***	*.53***	-

*$p \leq 0.05$; ** $p \leq 0.01$.

Figure 1.1. Coach Athlete Motivation Model (Mageau & Vallerand, 2003)

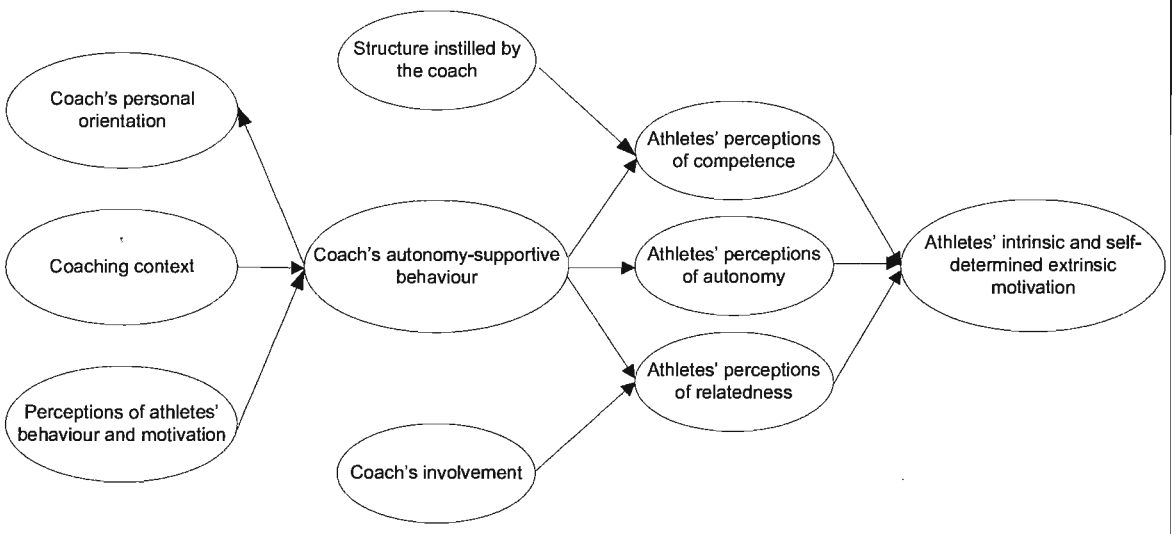


Figure 1.2. Hierarchical Model of Intrinsic and Extrinsic Motivation

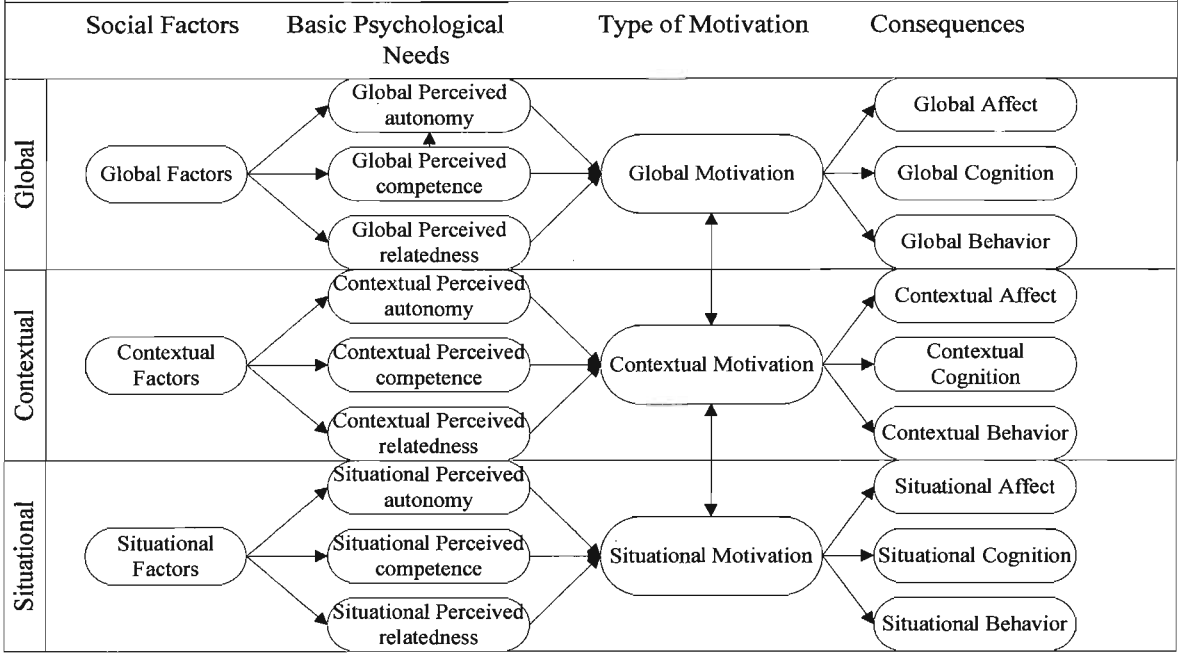


Figure 2.1. Diagram of the Flow of Participants

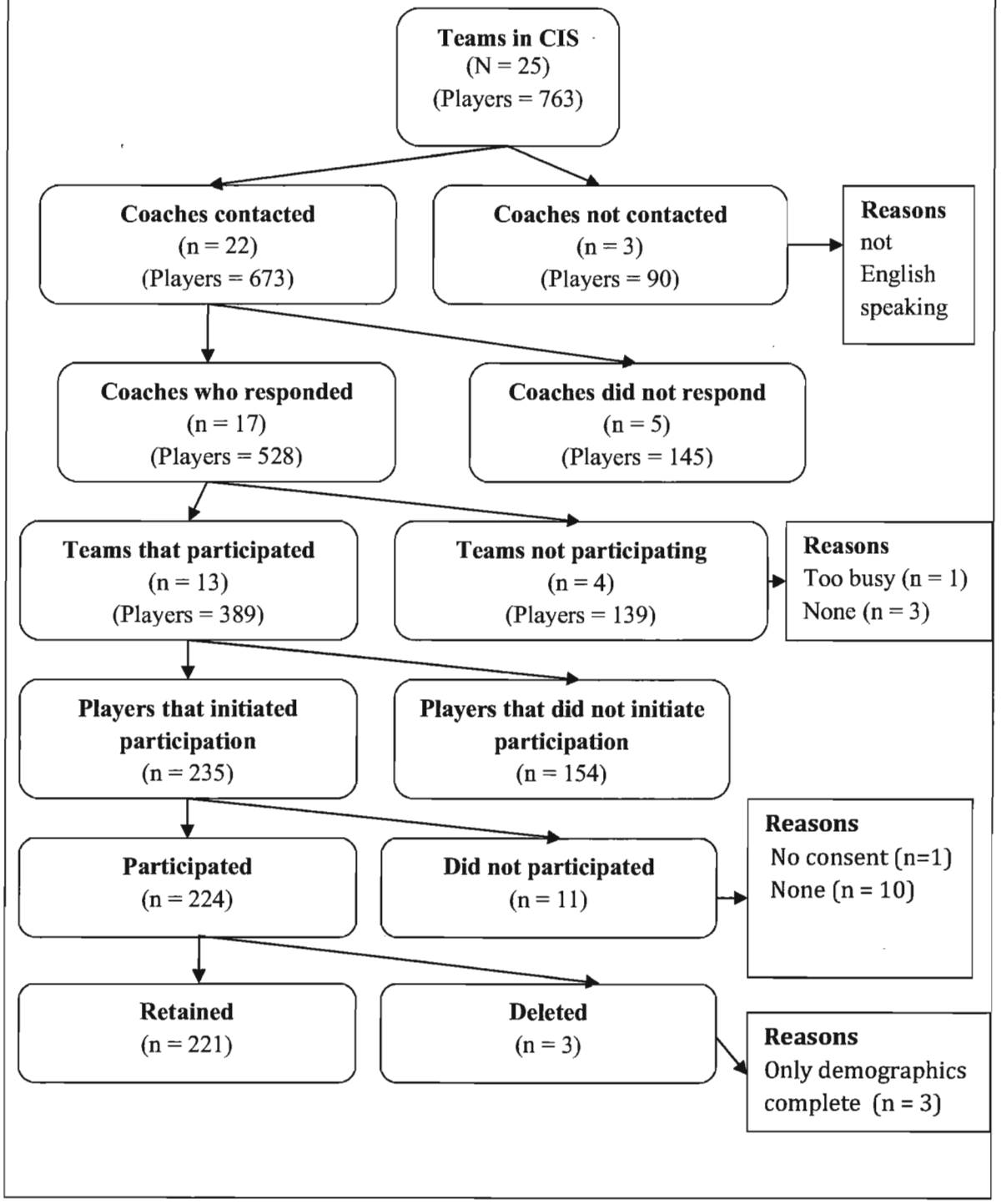
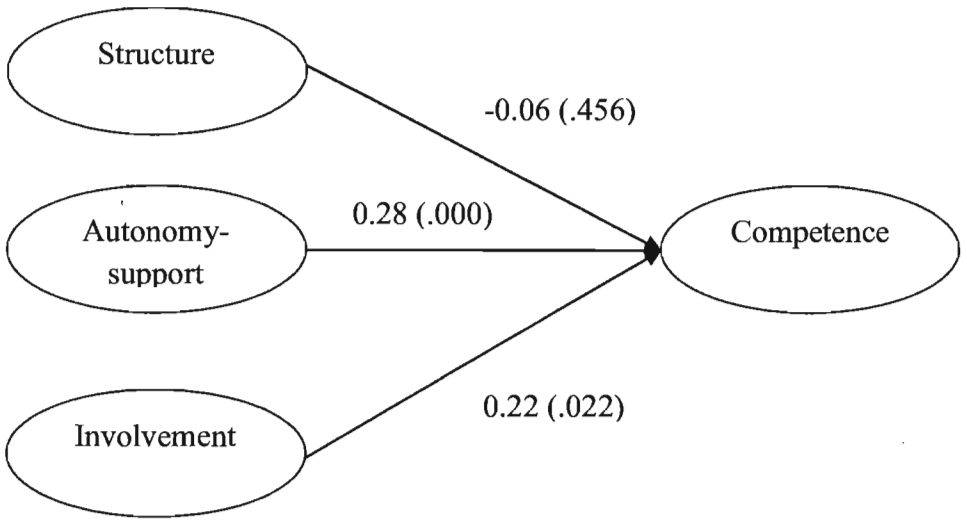
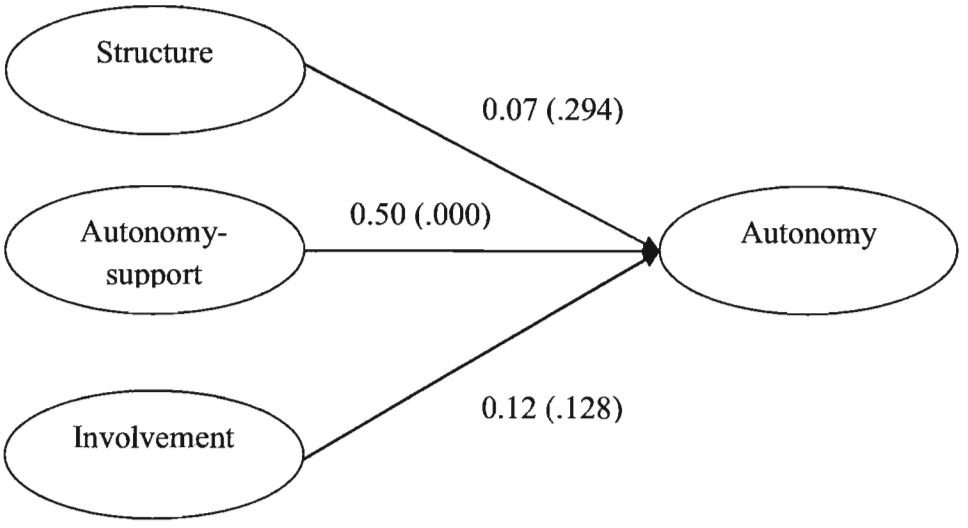


Figure 3.1. Multiple Regression Coefficients of Interpersonal Coaching Styles on Competence



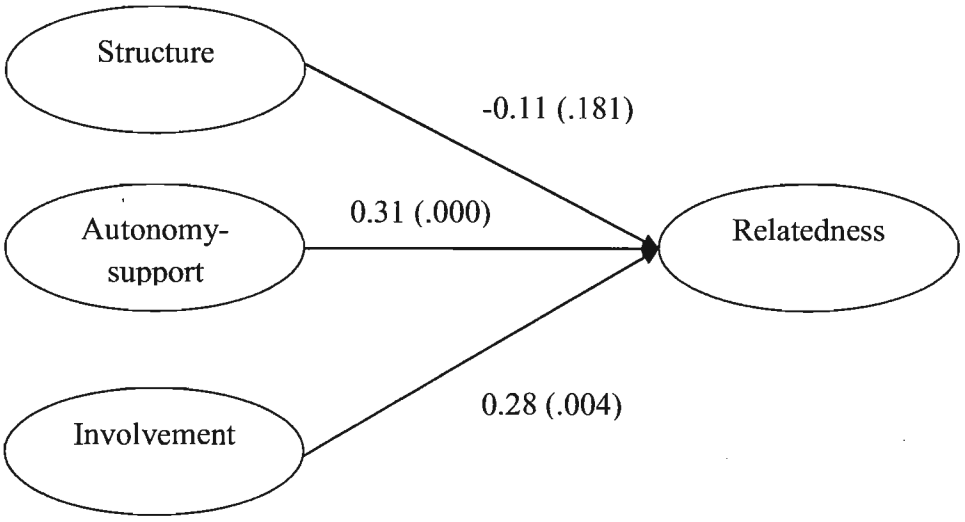
Note: Numbers represent standardized beta (β); value inside the parenthesis represent the significance (*p*-value).

Figure 3.2. Multiple Regression Coefficients of Interpersonal Coaching Styles on Autonomy



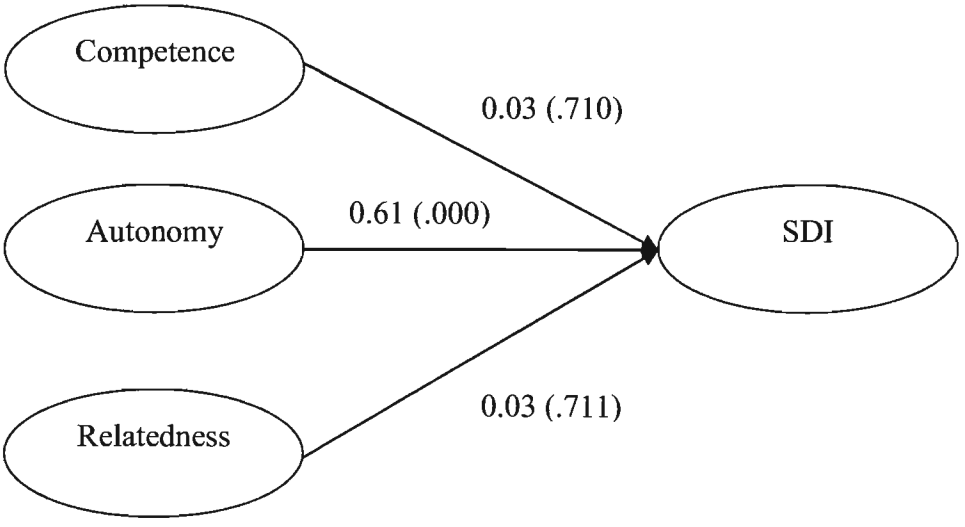
Note: Numbers represent standardized beta (β); Value inside the parenthesis represent the significance (*p*-value).

Figure 3.3. Multiple Regression Coefficients of Interpersonal Coaching Styles on Relatedness



Note: Numbers represent standardized beta value (β); value inside parenthesis represents significance level (*p*-value).

Figure 3.4. Multiple Regression Coefficients of Basic Needs on Self-Determined Motivation



Note: Numbers represent standardized beta (β); value inside the parenthesis represent the significance (*p*-value).

Appendix A: Primary Study

Section 1

Instructions: These questions will be used simply for demographic purposes to describe the participants in this study.

What is your age?

What is your primary playing position?

How many years have you been playing organized rugby?

How many years have you played CIS rugby including the current year?

What is the highest level of rugby you have played outside CIS varsity rugby?
____High school ____Club ____Rep ____Provincial ____National

During the following time periods, how many hours per week do you spend training for rugby including practice, games and weight/aerobic training?

Pre-season _____ Hours/week
Pre-season _____ Hours/week
Pre-season _____ Hours/week

What is your current starting status on the varsity rugby team at Brock University
____Don't know yet ____Non-starter ____Sometimes start/sometimes don't start
Starter

Section 2

Instructions: Using the scale below, indicate the frequency at which your coach, emits the behaviours presented below in games and training.

Never 1	Almost Never 2	Rarely 3	Sometimes 4	Often 5	Almost Always 6	Always 7

1.	I feel that my coach sincerely cares about me.	1	2	3	4	5	6	7
2.	My coach doesn't care if I succeed or fail.	1	2	3	4	5	6	7
3.	When I ask my coach to help me with a problem, he/she asks me what I think before giving me his/her opinion.	1	2	3	4	5	6	7
4.	The feedback I get from my coach makes me feel uncertain about my capacities.	1	2	3	4	5	6	7
5.	My coach encourages me to be myself.	1	2	3	4	5	6	7
6.	I feel that my coach honestly enjoys spending time with me.	1	2	3	4	5	6	7
7.	The feedback I get from my coach takes the form of useless criticisms.	1	2	3	4	5	6	7
8.	My coach seems to be genuinely interested in what I do.	1	2	3	4	5	6	7
9.	My coach only tells me about my faults.	1	2	3	4	5	6	7
10.	My coach provides me with lots of opportunities to make personal decision in what I do.	1	2	3	4	5	6	7
11.	My coach sends me the message that I'm inadequate.	1	2	3	4	5	6	7
12.	My coach openly acknowledges my thoughts and feelings although they may be different from his/hers.	1	2	3	4	5	6	7

Section 4

Instructions: Please answer the following questions using the scale below according to your feelings and experiences when participating in rugby.

Not at all true			Somewhat true			Very True
1	2	3	4	5	6	7

1.	In rugby, I feel close to other people.	1	2	3	4	5	6	7
2.	In rugby, I feel I am pursuing goals that are my own.	1	2	3	4	5	6	7
3.	I feel I participate in rugby willingly.	1	2	3	4	5	6	7
4.	In rugby, I get opportunities to make choices.	1	2	3	4	5	6	7
5.	In rugby, I feel that I am being forced to do things that I don't want to do.	1	2	3	4	5	6	7
6.	I can overcome challenges in my sport.	1	2	3	4	5	6	7
7.	I show concern for others in rugby.	1	2	3	4	5	6	7
8.	I choose to participate in rugby according to my own free will.	1	2	3	4	5	6	7
9.	In rugby, I have a say in how things are done.	1	2	3	4	5	6	7
10.	There are people in rugby who care about me.	1	2	3	4	5	6	7
11.	I am skilled at rugby.	1	2	3	4	5	6	7
12.	I feel I am good at rugby.	1	2	3	4	5	6	7
13.	In rugby, I can take part in the decision making process.	1	2	3	4	5	6	7
14.	I get opportunities to feel that I am good at rugby.	1	2	3	4	5	6	7
15.	In rugby, I really have a sense of wanting to be there.	1	2	3	4	5	6	7
16.	In rugby, I feel I am doing what I want to be doing.	1	2	3	4	5	6	7
17.	I have the ability to perform well in rugby.	1	2	3	4	5	6	7
18.	In rugby there are people who I can trust.	1	2	3	4	5	6	7
19.	I have close relationships with people in rugby.	1	2	3	4	5	6	7
20.	In rugby, I get opportunities to make decisions.	1	2	3	4	5	6	7

Section 5

Instructions: Using the scale below and the statements below, answer why do you practice/play your sport?

Not at all true			Somewhat true			Very True
1	2	3	4	5	6	7

1.	...because I enjoy it.	1	2	3	4	5	6	7
2.	...because I like it.	1	2	3	4	5	6	7
3.	...because it's fun.	1	2	3	4	5	6	7
4.	...because I find it pleasurable.	1	2	3	4	5	6	7
5.	...because it's a part of who I am.	1	2	3	4	5	6	7
6.	...because it's an opportunity to just be who I am.	1	2	3	4	5	6	7
7.	...because what I do in sport is an expression of who I am.	1	2	3	4	5	6	7
8.	...because it allows me to live in a way that is true to my values.	1	2	3	4	5	6	7
9.	...because the benefits of sport are important to me.	1	2	3	4	5	6	7
10.	...because it teaches me self-discipline.	1	2	3	4	5	6	7
11.	...because I value the benefits of my sport.	1	2	3	4	5	6	7
12.	...because it is a good way to learn things which could be useful to me in my life.	1	2	3	4	5	6	7
13.	...because I would feel ashamed if I quit.	1	2	3	4	5	6	7
14.	...because I would feel like a failure if I quit.	1	2	3	4	5	6	7
15.	...because I feel obligated to continue.	1	2	3	4	5	6	7
16.	...because I would feel guilty if I quit.	1	2	3	4	5	6	7
17.	...because if I don't other people will not be pleased with me.	1	2	3	4	5	6	7
18.	...because I feel pressure from other people to play.	1	2	3	4	5	6	7
19.	...because people push me to play.	1	2	3	4	5	6	7
20.	...to satisfy people who want me to play.	1	2	3	4	5	6	7
21.	...but I wonder what's the point.	1	2	3	4	5	6	7
22.	...but I question why I continue.	1	2	3	4	5	6	7
23.	...but the reasons why are not clear to me anymore.	1	2	3	4	5	6	7
24.	...but I question why I am putting myself through this.	1	2	3	4	5	6	7

Section 6

Instructions: Using the statements below, please rank your performance in rugby along the scale provided.

Very weak performance 1 2 3 4					**Very effective performance** 5
1. I make appropriate decision about what to do with the ball during the game/practice.	1	2	3	4	5
2. I efficiently execute rugby skills in a game/practice.	1	2	3	4	5
3. I move appropriately offensively, and defensively, as necessitated by the flow of the game.	1	2	3	4	5
4. I provide appropriate defensive cover, help, and backup for a player making a challenge for a ball.	1	2	3	4	5
5. I provide appropriate support for a teammate with the ball by being in a position to receive a pass.	1	2	3	4	5
6. I appropriately mark the opponent who may or may not have the ball.	1	2	3	4	5
7. I return to my appropriate position between skill attempts.	1	2	3	4	5

Appendix B: Pilot Study

Section 1: Demographics

Instructions: The following set of questions is designed to gain an understanding of your background characteristics as an expert in the area of rugby and/or sport psychology. These questions are important and will provide background information pertaining to the nature of our sample providing data in this study. There are no right or wrong answers so please answer as openly and honestly as possible.

1. **What is your age?_____**
2. **What is your gender? ____Male ____Female**
3. **Do you have any coaching certifications for the sport of rugby?__Yes____No**
   If yes, what coaching certificates have you attained?_____

4. What is the highest level of education you have attained?					
High school diploma	College degree	University bachelor degree	University Master's	University PhD	Post-doctoral Fellowship

5. **Which statement best describes your current status as a rugby coach?**
   a. **full-time**
   b. **part-time**
   c. **other (please describe:____)**
   d. **I do not coach rugby**

*Please answer the following five questions, considering only the sport of **RUGBY.***

6. **How many years have you spent playing organized rugby?____**
7. **Are you currently playing organized rugby?____**
   a. **If no, what year did you last play organized rugby?_____**

8. What is the highest level of rugby that you have competed in during your career?						
Never Played Rugby	High school	Club	Representative	University/College	Provincial	National

9. **How many years have you spent as a coach of rugby?____**

10. What is the highest level of rugby that you have coached at during your career so far?						
Never coached Rugby	High school	Club	Representative	University/College	Provincial	National

Note: This completes the demographics portion of the survey therefore this survey will no longer ask you questions about yourself. The following sections of survey will involve the evaluation of the seven items that make up the GPAI.

Section 1 (B): Demographics for Faculty Members

Instructions: The following set of questions is designed to gain an understanding of your background characteristics as an expert in the area of rugby and/or sport psychology. These questions are important and will provide background information pertaining to the nature of our sample providing data in this study. There are no right or wrong answers so please answer as openly and honestly as possible.

1. **What is your age?_____**
2. **What is your gender? ____**Male Female
3. **What year did you earn your doctoral degree?_____**
4. **What is your current professional rank (e.g., assistant-full professor, etc)?_____**
5. **Are you currently conducting research using rugby players?_____**
6. **Are you currently conducting research examining performance issues in the sport of rugby?____**
7. **Please list 3-5 areas that you feel capture the breadth of your research expertise.**
   1. **_____**
   2. **_____**
   3. **_____**
   4. **_____**
   5. **_____**

7. What is currently your *primary* area of research focus given the 3-5 areas of research you listed above?_____

8. What is currently your *secondary* area of research focus given the 3-5 areas of research that you listed above?_____

9. What is the name of the academic department that you are currently appointed in at your university?_____

10. How would you label your academic discipline?_____

Note: This completes the demographics portion of the survey therefore this survey will no longer ask you questions about yourself. The following sections of survey will involve the evaluation of the seven items that make up the GPAI.

Section 2: Technical Questions

This section will be the first of four sections that will ask you questions pertaining to the GPAI (Oslin, Mitchell, & Griffith, 1998) that was designed to assess performance in the sport of rugby. More specifically this section will ask you questions about the how clear and comprehendible you feel the seven items contained within the GPAI are.

Instructions: The following 7 items have been designed to measure distinct aspects of rugby performance for a study of female rugby players engaging in Canadian Interuniversity Sport. The instructions that are designed to precede the presentation of these items within the survey are as follows "Using the statement below, please rank your performance in CIS rugby since the beginning of THIS season, along the scale provided." The scale ranges from 1= very weak performance, to 5 = very effective performance.

We would like you to rate the technical qualities of each item comprising the GPAI using 4 questions. Each GPAI item will be presented in sequence followed by the four questions that will provide us with information about the technical qualities of each item measuring performance in rugby.

Item 1: I efficiently execute rugby skills.

1. Do you feel item 1 is exceptionally lengthy?	
No	Yes
Comment:	

2. Do you feel item 1 is too difficult to read?	
No	Yes
Comment:	

3. Do you feel item 1 is unclear?	
No	Yes
Comment:	

4. Do you feel item 1 asks about more than one concept?	
No	Yes
Comment:	

Item 2: I provide appropriate support for a teammate with the ball by being in a position to receive a pass.

1. Do you feel item 2 is exceptionally lengthy?	
No	Yes
Comment:	

2. Do you feel item 2 is too difficult to read?	
No	Yes
Comment:	

3. Do you feel item 2 is unclear?	
No	Yes
Comment:	

4. Do you feel item 2 asks about more than one concept?	
No	Yes
Comment:	

Item 3: I return to my appropriate position between skill attempts.

1. Do you feel item 3 is exceptionally lengthy?	
No	Yes
Comment:	

2. Do you feel item 3 is too difficult to read?	
No	Yes
Comment:	

3. Do you feel item 3 is unclear?	
No	Yes
Comment:	

4. Do you feel item 3 asks about more than one concept?	
No	Yes
Comment:	

Item 4: I appropriately mark the opponent who may or may not have the ball.

1. Do you feel item 4 is exceptionally lengthy?	
No	Yes
Comment:	

2. Do you feel item 4 is too difficult to read?	
No	Yes
Comment:	

3. Do you feel item 4 is unclear?	
No	Yes
Comment:	

4. Do you feel item 4 asks about more than one concept?	
No	Yes
Comment:	

Items 5: I make appropriate decisions about what to do with the ball during games.

1. Do you feel item 5 is exceptionally lengthy?	
No	Yes
Comment:	

2. Do you feel item 5 is too difficult to read?	
No	Yes
Comment:	

3. Do you feel item 5 is unclear?	
No	Yes
Comment:	

4. Do you feel item 5 asks about more than one concept?	
No	Yes
Comment:	

Item 6: I provide appropriate defensive cover, help and backup for a player making a challenge for a ball.

1. Do you feel item 6 is exceptionally lengthy?	
No	Yes
Comment:	

2. Do you feel item 6 is too difficult to read?	
No	Yes
Comment:	

3. Do you feel item 6 is unclear?	
No	Yes
Comment:	

4. Do you feel item 6 asks about more than one concept?	
No	Yes
Comment:	

Item 7: I move appropriately offensively, and defensively as necessitated by the flow of the game.

1. Do you feel item 7 is exceptionally lengthy?	
No	Yes
Comment:	

2. Do you feel item 7 is too difficult to read?	
No	Yes
Comment:	

3. Do you feel item 7 is unclear?	
No	Yes
Comment:	

4. Do you feel item 7 asks about more than one concept?	
No	Yes
Comment:	

Sections 3: Item-Content Relevance

This section was designed to provide us with an understanding about how relevant you feel each GPAI item is in relation to the 7 performance constructs which are defined at the bottom of each page. Please note that for the purposes of this study relevance is defined as "the degree to which the content contained within the test item is representative of the content the item is designed to measure" (Messick, 1995).

Instructions: The 7 items comprising the GPAI have been designed to assess distinct aspects of rugby performance. The constructs defined below refer to the different aspects of performance that the 7 items have been designed to measure. Please take a moment to familiarize yourself with the following descriptions of each performance construct presented below. Once you are comfortable with the meaning of each construct, we would like you to rate the **relevance of each item** in relation to **all 7 performance constructs** defined below.

You are welcome to provide additional comments pertaining to each item as you wish that may help clarify your response to these questions. We have provided an example below for clarity and information purposes only.

Example: "In the sport of rugby, players do not have a designated position to return to between skill attempts therefore item 3 is not representative of any of the constructs provided."

Construct Definitions: The 7 constructs embedded in the GPAI are defined in the following manner by Oslin, Mitchell and Griffith (1998).

Base: Appropriate return of performer to a "home" or "recovery" position between skill attempts.

Adjust: Movement of performer, either offensively or defensively, as required by the flow of the game.

Decisions made: Making appropriate choices about what to do with the ball during the game.

Skill Execution: Efficient performance of rugby skills.

Support: Off-the-ball movement to a position to receive a pass.

Cover: Defensive support for players making a play on-the-ball, or moving to the ball.

Mark: Defending an opponent who may or may not have the ball.

Please rate the content relevance of item 1 using the scale provided against each of the seven definitions provided below.

Item 1: I efficiently execute rugby skills.					
Concept	**Poor Match**	**Fair Match**	**Good Match**	**Very Good Match**	**Excellent Match**
Base					
Adjust					
Decisions Made					
Skill Execution					
Support					
Cover					
Mark					
Comment:					

Please rate the content relevance of item 2 using the scale provided against each of the seven definitions provided below.

Item 2: I provide appropriate support for a teammate with the ball by being in a position to receive a pass.					
Concept	**Poor Match**	**Fair Match**	**Good Match**	**Very Good Match**	**Excellent Match**
Base					
Adjust					
Decisions Made					
Skill Execution					
Support					
Cover					
Mark					
Comment:					

Please rate the content relevance of item 3 using the scale provided against each of the seven definitions provided below.

Item 3: I return to my appropriate position between skill attempts.					
Concept	**Poor Match**	**Fair Match**	**Good Match**	**Very Good Match**	**Excellent Match**
Base					
Adjust					
Decisions Made					
Skill Execution					
Support					
Cover					
Mark					
Comment:					

Please rate the content relevance of item 4 using the scale provided against each of the seven definitions provided below.

Item 4: I appropriately mark the opponent who may or may not have the ball.					
Concept	**Poor Match**	**Fair Match**	**Good Match**	**Very Good Match**	**Excellent Match**
Base					
Adjust					
Decisions Made					
Skill Execution					
Support					
Cover					
Mark					
Comment:					

Please rate the content relevance of item 5 using the scale provided against each of the seven definitions provided below.

Item 5: I make appropriate decisions about what to do with the ball during games.					
Concept	**Poor Match**	**Fair Match**	**Good Match**	**Very Good Match**	**Excellent Match**
Base					
Adjust					
Decisions Made					
Skill Execution					
Support					
Cover					
Mark					
Comment:					

Please rate the content relevance of item 6 using the scale provided against each of the seven definitions provided below.

Item 6: I provide appropriate defensive cover, help and backup for a player making a challenge for a ball.					
Concept	**Poor Match**	**Fair Match**	**Good Match**	**Very Good Match**	**Excellent Match**
Base					
Adjust					
Decisions Made					
Skill Execution					
Support					
Cover					
Mark					
Comment:					

Please rate the content relevance of item 7 using the scale provided against each of the seven definitions provided below.

Item 7: I move appropriately offensively, and defensively, as necessitated by the flow of the game.					
Concept	**Poor Match**	**Fair Match**	**Good Match**	**Very Good Match**	**Excellent Match**
Base					
Adjust					
Decisions Made					
Skill Execution					
Support					
Cover					
Mark					
Comment:					

Base: Appropriate return of performer to a "home" or "recovery" position between skill attempts.

Adjust: Movement of performer, either offensively or defensively, as required by the flow of the game.

Decisions made: Making appropriate choices about what to do with the ball during the game.

Skill Execution: Efficient performance of rugby skills.

Support: Off-the-ball movement to a position to receive a pass.

Cover: Defensive support for players making a play on-the-ball, or moving to the ball.

Mark: Defending an opponent who may or may not have the ball.

Section 4: Item Content Ratio

This section was designed to capture your feelings regarding the usefulness of each of the GPAI items for assessing performance in the sport of rugby.

Instructions: We would like to get your impression of each item contained in the GPAI that were designed to measure performance in the sport of rugby. Please look at each item and rate how "essential' you feel the content of each item is for measuring performance in rugby.

Item 1: I efficiently execute rugby skills.		
Not Necessary	Useful	Essential
Item 2: I provide appropriate support for a teammate with the ball by being in a position to receive a pass.		
Not Necessary	Useful	Essential
Item 3: I return to my appropriate position between skill attempts.		
Not Necessary	Useful	Essential
Item 4: I appropriately mark the opponent who may or may not have the ball.		
Not Necessary	Useful	Essential
Item 5: I make appropriate decisions about what to do with the ball during games.		
Not Necessary	Useful	Essential
Item 6: I provide appropriate defensive cover, help and backup for a player making a challenge for a ball.		
Not Necessary	Useful	Essential
Item 7: I move appropriately offensively, and defensively, as necessitated by the flow of the game.		
Not Necessary	Useful	Essential

Section 5: Content Representation

The 4 questions in this section have been designed to ask you how you feel the seven items contained within the GPAI represent performance in the sport of rugby.

Instructions: The final section of this questionnaire seeks to gain your insights into the degree to which all 7 items comprising the GPAI fully and completely represent the construct of performance in women's rugby. Please rate the extent to which the full set of 7 items comprising the GPAI represent the construct of performance in women's rugby using the questions provided below. The full set of items has been presented along with each question for your reference.

1. How well do you feel all seven items represent the overall concept of performance in rugby?				
Poor Representation	Fair Representation	Good Representation	Very Good Representation	Excellent Representation
Comments:				

2. Do you think the items are appropriate for use with female Canadian Interuniversity Sport rugby players in terms of the degree to which they represent the overall concept of rugby performance?				
Not at All	Not Really	Somewhat	Yes	Yes, absolutely
Comments:				

3. Are there any additional items that you feel should be included to represent overall performance in rugby?	
No	Yes
If yes, please indicate what these items are:	

4. Do you feel that any of these seven items measure more than performance in rugby?	
No	Yes
If yes, please indicate what these items are, and why you feel this way:	

Games Performance Assessment Instrument Items

Item 1: I efficiently execute rugby skills.
Item 2: I provide appropriate support for a teammate with the ball by being in a position to receive a pass.
Item 3: I return to my appropriate position between skill attempts.
Item 4: I appropriately mark the opponent who may or may not have the ball.
Item 5: I make appropriate decisions about what to do with the ball during games.
Item 6: I provide appropriate defensive cover, help and backup for a player making a challenge for a ball.
Item 7: I move appropriately offensively, and defensively as necessitated by the flow of the game.

Introduction

The validity of an instrument is an essential consideration for any researcher. Validity is often broken down into multiple sources, one of which is content validity, which is established by demonstrating that the items contained within an instrument characterize what they are intended to measure. According to Messick (1995), two major threats to content validity exist: item-content under-representation and item-content-irrelevance. Item-content representation addresses the degree to which the instrument items include all important dimensions or facets of a construct (Messick, 1995). Item-content relevance refers to the degree to which the content contained within a test/instrument encompass the "target construct" that it is intended to measure (Dunn, Bouffard, Rodgers, 1999). In addition, the structural components of an instrument have been advocated to be important considerations of a test, whereby the length, difficulty, clarity, and double-barreled nature of the test are essential to designing a "good instrument" (Devellis, 2003).

Purpose

The purpose of this study was to examine the item-content relevance and representation, as well as structural components of the Games Performance Assessment Instrument (Oslin et al., 1998). The GPAI was initially designed for the use of physical education teachers to assess their students' performance in a variety of sports. However, the primary study mentioned previously has modified some of the instruments for the purpose of assessing CIS female rugby players in the sport of rugby.

Participants

Participants included expert judges from four categories, including current CIS female rugby players ($n = 9$), previous CIS female rugby players ($n = 7$), CIS female rugby coaches ($n = 6$), and faculty members conducting research in sport and exercise psychology ($n = 8$). Current CIS rugby players were aged ($M = 21.37$; $SD = 1.27$; *range* = 19-23), they reported playing organized rugby for four to nine years ($M = 7.00$; $SD = 2.16$), and reported the highest level of rugby played was university ($n = 6$) or national ($n = 1$). Previous CIS female rugby players were aged ($M = 22.11$; $SD = 1.17$; *range* = 20-24), who reported playing organized rugby for two to nine years ($M = 7.11$; $SD = 2.09$), with highest level of rugby reported as university ($n = 6$), and provincial ($n = 3$). CIS female rugby coaches were both male ($n = 3$) and female ($n = 3$), aged twenty-six to forty-three ($M = 37.00$; $SD = 6.60$), reported that the highest coaching certification that they had attained was level one ($n = 1$), level two ($n = 1$), level three ($n = 2$), and level four ($n = 2$). Coaches also reported coaching between four to twenty-two years ($M = 16.5$; $SD = 6.68$), and indicated that the highest level of rugby that they had coached was university ($n = 2$), provincial ($n = 1$), and national ($n = 3$). Finally, faculty members ranged in age from thirty-four to fifty years old ($M = 37.11$; $SD = 5.37$) and represent a variety of departments which included Physical Education, Sport, Health, Exercise, or Physiotherapy Science, and specialized in disciplines encompassing exercise and/or sport psychology. Faculty participants reported a variety of research interests, with four indentifying that they had included rugby participants and four reporting that they had measured sport performance in their research.

Procedure

Participants were asked to complete four main sections, beginning with demographics, followed by structural components of the GPAI, then item-content relevance questions and finally item-representation questions. The structural components section began by informing participants of the initial purpose of the GPAI, followed by the stem and rating system. Participants were then asked a sequence of yes/no questions pertaining to the length, difficulty, clarity and double barreled nature of each item, and were provided a comment box for each question. Section three addressed item-content relevance questions, whereby participants were provided with the definition of content-relevance, then advised to familiarize themselves with the definitions of the performance concepts with each representing an item contained within the GPAI. Thereafter, participants were asked to rate the content relevance of each item across all performance concepts using a five point Likert scale ranging from "1 = poor match" to "5 = excellent match". Section four asked participants "how useful each of the GPAI items" were, with response options of "not necessary", "useful" and "essential". The final sequence of questions addressed the representation of all items using a five point Likert scale ranging from "poor representation" to "excellent representation". In total, this questionnaire took approximately thirty minutes to complete.

Results

Technical Qualities of GPAI

Item #	Length	Difficulty	Clarity	Multi-barreled
1	93.3	83.3	73.3	56.7
2	80.0	86.7	86.7	80.0
3	96.7	93.3	53.3	76.7
4	90.0	90.0	73.3	76.7
5	96.7	100.0	86.7	80.0
6	73.3	73.3	66.7	53.3
7	93.3	86.7	83.3	33.3

Note: The numbers in the table represent the percentage of the participants that selected "no" to the following questions; "Do you feel item X is exceptionally lengthy?" "Do you feel item X is too difficult to read?" Do you feel item X is unclear?" and Do you feel item X asks about more than one concept?"

Matching the Relevance of Each Item to the Conceptual Definition of the Item

	#1	#2	#3	#4	#5	#6	#7
Base	2.47 (1.41)	2.55 (1.52)	4.17 (1.34)	2.35 (1.27)	1.83 (1.15)	2.47 (1.27)	2.78 (1.24)
Adjust	2.83 (1.29)	3.65 (0.99)	3.31 (1.15)	3.55 (1.00)	2.59 (1.13)	3.50 (1.00)	4.46 (0.89)
Decisions Made	3.17 (1.49)	2.55 (1.38)	2.32 (1.39)	2.45 (1.19)	4.69 (0.65)	2.43 (1.40)	2.68 (1.15)
Skill Execution	4.43 (0.73)	2.93 (1.20)	2.69 (1.23)	2.90 (1.18)	3.31 (1.02)	2.96 (1.19)	2.85 (1.22)
Support	2.83 (1.34)	4.55 (0.72)	2.86 (1.22)	2.07 (1.36)	2.38 (1.38)	2.64 (1.49)	3.14 (1.07)
Cover	2.77 (1.36)	2.33 (1.47)	2.72 (1.39)	3.20 (1.37)	2.21 (1.24)	4.43 (0.76)	3.29 (1.20)
Mark	2.90 (1.30)	2.03 (1.30)	2.45 (1.40)	4.59 (0.81)	2.07 (1.23)	3.25 (1.30)	3.18 (1.15)

Note: values provided are the means, and standard deviations are contained within the ().

The Relevance of Each Item in Terms of Usefulness

Item Number	Not necessary	Useful	Essential
1	10.0	33.3	50.0
2	0.0	26.7	66.7
3	23.3	36.7	33.3
4	0.0	30.0	63.3
5	0.0	20.0	73.3
6	3.3	26.7	63.3
7	0.0	20.0	73.3

Note: The numbers represent the percentage of participants that reported the column heading for the corresponding item number.

Participants were asked to what degree they felt that all seven items contained within the instrument represented the concept of sport performance. The findings indicate that "very good" (n =2) was most frequently reported, followed by "good" (n = 7), then "excellent" (n = 3) and "fair" (n = 3). In addition, participants were asked to what degree they felt these seven items are appropriate to use with CIS female rugby players to represent the concept of rugby performance. Participants reported the following findings "not really" (n = 1), "somewhat" (n = 6), "yes" (n = 13), and "yes, absolutely" (n = 7). In addition, 12 participants responded "yes" and twelve participants responded "no" when asked if there were any additional items that should be included to represent the overall concept of performance in rugby. Finally, twenty-two out of twenty-seven participants indicated that they did not believe that the seven questions contained within the questionnaire measured more than the overall concept of performance in rugby.